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ORIGINAL COMMUNICATIONS.

"A body of men engaged in the same pursuit form a joint stock of their information and experience, and thereby put every individual in possession of the sum total acquired by them all"—REV. DR. WILLIAM CARLY.

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INDIAN GARDENS AND WHAT TO GROW IN THEM

PREFACE.

INTER FOLIA FRUCTUS.

This unpretending work is composed of gleanings from the gardens of the most advanced Horticulturists, supplemented with the practical experience of the writer, in many stations of this Presidency. Its shortcomings are self-evident, and omissions many; but as a complete compilation cannot be compressed into so small a publication, much has been dispensed with that was thought more suitable to a book of a decided botanical nature, in order to obtain the desire in view, a wish to produce a volume whose merits should chiefly rest upon usefulness with portability at a reasonable cost.

Horticulture of late years has made rapid strides. Discoveries and improvements have been notified month by month, if not day by day, in many well known pamphlets. From these much has been collated and condensed to afford information to the amateur gardener, hoping to assist in shewing what to grow, when to grow, how to grow; and where to grow, the most useful and ornamental of Nature's productions in an Indian Garden.

THE AUTHOR.

VOL. 4., PART I., NEW SERIES.

## THE VEGETABLE GARDEN.

*Introduction.*—As the season for growing our best garden productions is limited in the plains to a period ranging from four to seven months, according to latitude, the thought, care, and study required for a rotation of crops is unnecessary; the gardener is therefore only called upon to make the most of time and space at his command. As seed for most vegetables must be imported, the skill and attention bestowed upon its culture by the most experienced gardeners in the world relieves the amateur from much anxiety about its fertility, which would be incurred were he called upon to grow and mature it for his garden; the only study, therefore, required is, to know how to prepare the soil to suit the seeds he may wish to grow, and to plant those seeds in such a manner, and at such a time, as to ensure their growing provided of course the seeds possess the germs of fertility; acting on this knowledge, Nature performs her part and produces a plant which will mature, or not, according to the future treatment it receives.

*Soil.*—As good plants will not flourish in poor soil, it should be known that the best garden soil is composed of equal portions of chalk, clay, sand, and vegetable mould. In many stations as one or other of the earths are not procurable, the nearest approach to them may be substituted, as slaked lime for chalk, &c. As vegetable mould forms the flesh of the plant, it is better to give an excess of this, than too little. All large headed vegetables as the cabbage, cauliflower, broccoli; consume very largely the nutriment contained in this earth, and it is scarcely possible to give them too liberal a supply of this manure.

*Depth of soil.*—As the depth of soil varies so much in different stations, it is impossible, as well as impracticable, to lay down any definite rule for guidance as to what should be the depth of soil for the kitchen garden. Most gardeners

are content with three feet, which appears to be ample, judging from the splendid productions they are able to exhibit.

*Drainage.*—Drainage is of vital importance, and is quite as necessary for vegetable as for animal life, and the more room there is for the admission of oxygen, the healthier will be the plants, frequent diggings are, therefore, essentially necessary.

*Situation.*—About situation one has so little to say, the land being usually attached to the dwelling, and the site marked out; and if a vegetable garden is desired, the best has to be made of this spot. Too frequently the site is enclosed with high trees, or dense shrubs are scattered about to give as much shade as possible, where the least is required. Nothing is more injurious to vegetables than the dropping from trees: it is ablutionary water of an objectionable character. When situation can be selected, choose a north aspect for that part of the garden intended for tap-rooted and bulbous vegetables, a south-west aspect for edible-leaved plants. Give as much light and air as possible, and dispense with all shade.

*Watering.*—Watering must depend upon the nature of the season as well as the nature of the plants. A retentive soil, as clay, requires less than a friable. Much injury is often done by too much watering. When the water percolates at once through the soil in place of remaining to stagnate, little or no injury is ever done by this. An evening watering is equal to two in a morning, on account of the evaporation being less.

*Manures.*—Manures of kinds are invaluable to a garden: they should be judiciously given, agreeably to the constitution of the plants they are intended to nourish, or they do much harm; for instance peas are ruined with it, whilst the cabbage tribe are starved without it. All stable litter should be allowed to heat and thoroughly rot, so that it will almost crumble in the handling, before it is disposed of in the garden. The

manure from goats and sheep is much too strong for general purposes, and requires to be given with caution; that from cows is better mixed with stable litter and allowed to decompose with it. The dung from the fowl house or pigeon cot is valuable only for flowers.

*Liquid manures.*—Liquid manures are made by adding three parts of water to one part of solid manure, allowing the same to ferment and subside. This should be used in a diluted state, by adding one-third part of water.

## ARTICHOKE

*Cynara Scolymus.*

There are two kinds of this esculent, the conical and globe. They may be propagated by seed or suckers. If the former, in drills twelve inches apart, and the distance between the drills, nineteen inches. They should not be disturbed until they are at least a foot high, when they may be planted out at a distance of three feet from each other.

Suckers may be treated in the same way as young seedlings. A rich soil produces an abundance of heads. Water freely—little care is necessary, as the plants die down and come up again.

The time for planting is July to September. A new bed should be made every fifth year.

## JERUSALEM ARTICHOKE

*Helianthus Tuberosus.*

This member of the sunflower family, though of little renown in England, is much esteemed, and better known in the Tropics, where its tubers often attain a considerable size.

Small tubers are usually reserved for crops and planted whole; the plant grows to a height of six or seven feet, and blooms freely. White-ants commit great havoc if the tubers are left too long in the ground after they have matured.

The soil need not be a very rich one; the tubers should be planted fifteen inches apart, in rows two feet wide, and treated much in the same manner as potatoes by earthing up. When the stems die down, the tubers should be taken up, and stored between layers of sand, free from the ravages of cricket and mice.

Time for planting May.

## ASPARAGUS

### *Asparagus Officinalis*

This hardy esculent is said not to reach perfection before the sixth year of its existence, and its cultivation is no where so thoroughly understood as in France, where it is much valued and forms a delicacy for the table. The very general use of this vegetable gives employment to thousands, who make its cultivation a careful study.

It may be taken for granted, as varieties are named by English and Foreign growers, that they exist, notwithstanding a very strong belief to the contrary.

The seed most to be relied upon is that taken fresh from the berry, in a dry and matured condition.

Asparagus seed should be sown in a bed previously prepared by mixing a layer, six inches deep, of good manure with sand, which should be well dug, and mixed with the earth to a depth of six or eight inches. The seed should be planted in drills, ten inches apart, and flooded occasionally.

When the plants are nearly a year old, it will be necessary to select sites for trenches: i. e. should run north and south.

Trenches should be formed in the shape of the letter V, the width at the top being two feet, with a gradual gradient towards the apex of the letter, leaving a width of eight inches for the hedding of the plant.

The depth of the trench should be twenty-two inches; four inches of good rich soil is to be added every year after the first, and the exhausted soil removed. The plant is in its

pine in its sixth year, and may be cut for a period of two months. A good bed will not expend itself under eighteen years.

When the plants are ready for transplanting, each should be taken and placed in eight inches of black soil, composed of soil manure, the roots extended, and planted in the centre of the trench. Great care must be taken not to injure them, as they are very brittle, and damage done is of vital importance.

When the plants are three years old, they may be cut sparingly. In using the knife it will be well to guard against cutting unseen shoots. Large growers of asparagus never cut the same trench two consecutive years. When the shoot is six inches above the surface, it may be cut two inches below the earth.

Young stems should be tied to a stake to prevent their being broken. Old stems should be allowed to wither and die off the plant.

The season for planting is August. Asparagus may be forced in March by digging a trench on either side of the bed and filling the same with fresh stable manure. It may be blanched by covering the crown of the plant with a few inches of fine earth and sand.

The kinds mostly grown are the Giant, Connover's colossal, La Hâtive d'Argenteuil, l'Ordinaire.

Salt, where the soil is not impregnated with it, may be used with much benefit as a manure.

## THE RUNNER BEAN

*Phaseolus Multiflorus.*

The soil required for the runner bean is of the same description as laid down for the French or dwarf kind, but the after treatment is dissimilar. The runner seldom succeeds below Lahore, but it grows to perfection in the Himalayas where it puts forth an abundance of flowers and crops heavily. The roots of this plant may be taken up after fruiting and

preserved in sand for successive yearly crops, as it will last several years, with the great advantage over seedlings, that its yield is greater, and a month earlier. The most satisfactory way of growing the runner in the plains is to stop its climbing and make it grow in the form of a bush; this is done by nipping off all running shoots as they appear. When grown in this manner, they must be planted in rows, thirty inches apart, and a single bean must be placed every twelve inches, under two inches of earth. If grown as a runner, it must be supported on rods or poles, or may be grown over a lattice when required for the ornamental as well as useful. Three inches must separate each seed in this plan of growing.

Water moderately.

Plant in Lower Bengal in September, in the North-West, in October, and the Hills in April.

Carter's champion, the Painted lady, and the Scarlet runner are the best known varieties.

### COMMON BEAN

*Faba Vulgaris.*

Plant this kind of bean in the soil named for French beans, two inches deep, in rows, with a space of two and-a-half feet between them; each seed must have a space of six inches. If the beans have not been soaked previously to sowing, the earth must be very moist at the time of planting them out. A north aspect is the best.

This pulse too frequently disappoints the grower: it comes up strong, and in a short time puts up several shoots, and throws out a head full of buds and bloom: these fall and die, leaving a bare and almost withered stalk. The plan of cutting off half the buds is frequently followed, with the result of obtaining a few pods. Another plan is to cut off the primary stem, with as little success. Perhaps, no vegetable has had more care and attention bestowed upon its cultivation giving so illiberal a return.



Plant in October, either the Fan, Hooper's monster, Broad Windsor, Hooper's prize, or the early Mazagon.

## BEET

*Beta Vulgaris.*

Of the several varieties of beet, two only are fit for the vegetable garden, the others being generally used for cattle.

Beet, in common with marine plants, has a great natural desire for salt, and the grower who gives a liberal dressing of this manure seldom has cause to regret his liberality.

Beet for table use is either red, or white, called silver-leaved: the first is used for salads, and the last, agreeably to its cultivation, is used as a spinach, or a substitute for asparagus.

It should be remembered by those who wish to grow this root, that there is no object in endeavouring to obtain unusually large beet. After it has obtained a diameter of three inches, and a length of twelve or fourteen, it has a tendency to become hard and fibrous; the color for red beet is a dark crimson, and its full flavor is retained when the root is boiled or baked without an abrasion.

White or silver-leaved beet is grown solely for its leaves. When they are not earthed up and blanched, they can be dressed as spinach. Blanching the stalks, and treating them as asparagus, will make a very agreeable substitute for that esculent. It is a desideratum to obtain fresh seed.

The soil should be well prepared and dug to the depth of three feet, all clods being finely broken, and stones, if any, removed, and manure of a previous year mixed with salt and sand well dug in. When the earth is prepared, make ridges four inches high, with a distance between them of fourteen inches. They should be made to run north and south, free from top shade, or shelter of any kind.

When the soil is not dug sufficiently deep, the roots will be stunted; with a quantity of fingers and toes. For an early

crop, seed should be planted in boxes or earthen pots in the month of August: these will be fit to plant out in September; consecutive crops can be obtained by sowing up to January. Plants are easily transplanted, care being taken not to injure the root.

The second crop should be planted on ridges, two or three seeds being placed in one hole. This method prevents unsightly gaps. The distance between each plant should be twelve inches. When four leaves appear, the weak plants should be rooted up and thrown away.

White beet requires a space of fifteen inches on account of the umbrageous character of its leaves, the space between the rows should be fifteen inches also.

When the plants have been in the ridges a month, they should be cleared of weeds and any broken leaves. Great care is required in this operation on account of the brittleness of the leaves; they should at this time be earthed up to the crown.

Water freely.

The kinds mostly grown are Hooper's incomparable, New crimson-leaved, common Blood-red, dark red Egyptian turnip, of the red kind.

The Edible-leaved, Improved silver, and Curled silver, of the white.

The very dark-leaved description forms an ornamental border to a flower bed, and its leaves decorate very prettily, various and dishes.

## BROCCOLI

*Brassica Acephala.*

This justly neglected vegetable in the plains of India will ever give place to its more cultivated affinity, the cauliflower. The slopes of the Himalayas with a northern aspect, or the Frontier latitude, may be more kindly disposed and favor its growth.

There are three varieties of this indifferent cauliflower, the white, green, and purple.

Seed should be obtained very fresh, and the months of August or September be selected for sowing. When sown, it should be covered very lightly with fine earth to the depth of one-eighth of an inch, and kept moist. It should be sown in boxes in a verandah, or other shady place, in August, and in a prepared bed in the month of September. When the plants have six leaves, they should be pricked out, then allowed to remain until twelve leaves have appeared. The space required for each plant in this transitory stage is five inches.

Broccoli rarely obtains to the size one is accustomed to see it in Europe: its growing room can, therefore, be curtailed, and a space of thirty-three inches will be found ample for each plant.

When the plant forms its flower head, it is well to break off a leaf or two and place them over, replacing them as they become decayed; this is a protection required from sun and rain. When the flower begins to expand, it should be cut.

The cultivation laid down for cauliflowers suits this vegetable.

The varieties usually grown are white, Early Cornish, Superfine early, Chappell cream, Howden's dwarf purple, Purple cape, Early purple, and Brimstone.

## CABBAGE

*Brassica Oleracea.*

Among so many so-called varieties of this cruciferous vegetable, bearing the names of all noted growers, one would apprehend a difficulty in the selection of seed. This would be the case were the varieties actually as various as their names imply, but it is an admitted fact, that in many cases no difference is perceptible, and the new kinds after a little time assume the shape, dimensions, and reputation of those old and established; yet the names cling long after the novelty supposed to have attached to them has passed away.

Imported seed alone can be relied upon, and that must be of the freshest description. When received, it should be carefully packed, as air-tight as possible, and kept so until required for sowing.

Seed for early cabbages may be sown in a box or pan in the middle of August, and should be selected from Wheeler's imperial early nonpareil, Early York, and Tiley's new early marrow. The soil should be light and well drained with charcoal foundation; very young plants are apt to damp off, in the rains, hence the necessity of shelter. The fly also is very troublesome and destroys many—dusting them with charcoal, finely powdered, will protect them from its ravages. A later crop may be planted out in October from September plants, taken from Kent's incomparable, the Enfield, Large imperial Oxheart and the fine-tasted Drumhead.

Planting out may take place when six leaves have appeared, always selecting the evening for the work. Water freely, when all have been planted. Each plant of the smaller kind must have a square of fifteen inches. A hole should be dug in the centre, two feet deep, by eight in diameter; this should be filled up to two inches of the surface with rich old manure; mixed with a little earth, the young plant is then inserted and firmly pressed down.

The larger cabbages require a square of three feet as a bed.

Water and light are life to a cabbage as much as manure proves to be its food.

An occasional dressing with liquid manure is very beneficial.

Red cabbage seed should be sown in September, either as above stated, or in the open air, on a raised bed that can be sheltered, when required, from sun and rain. They may be planted out and grown as other cabbages, with this exception, that they require less water, as it fills the veins with too much liquid and spoils it for pickling.

The best Savoy cabbages are the Dwarf green-curled, the Large green German, and Sutton's golden globe. They require the same cultivation as the ordinary cabbage.

Brussel's sprouts should be treated as Savoy, the large leaves should be cut off to allow the sprouts to shoot. Scrymger's giant is the best seed to grow.

Borecole, unlike Brussels sprouts, must have the centre shoot taken off to promote the growth of the lateral sprouts. Cottager's Kale, Rosette, and Buda are noted kinds.

## CAPSICUM AND CHILLI

### *Capsicum.*

The above plants are very extensively cultivated. They may be grown for use or ornament.

The seed may be sown any time in the cold weather, and the plant will continue bearing well until the rains. Sow in pots, well drained, lightly covering the seeds. When four inches high, plant out into beds made of ordinary garden soil.

Those grown for ordinary purposes are the bird's-eye chilli, cherry-shaped chilli, and the long red chilli.

The capsicum varieties are the long red capsicum, the Prince of Wales, a yellow kind, and the red tomato shaped.

Water moderately. Cut the fruit stalk, as the stems are apt to be injured by taking the fruit any other way.

## ENDIVE

### *Cichorium Endivia.*

This hardy annual requires a very rich soil, well dug and drained. The seed should be planted in October, a quarter of an inch below the surface, in a well prepared bed in the open air. When the young plants appear, water sparingly. In three weeks or a month they may be transplanted and placed at intervals of fifteen inches, the largest and strongest plants

being selected; those remaining can be utilized for successive crops. It takes between two and three months for the plants to be ready for blanching.

There are two ways of blanching; the first to tie the plant up and so exclude the light from the heart, the second to place earthen pans over them and allowing the rims to rest in sand. The first method has a great objection attached to it, inasmuch as a drop of water, either dew or rain, will decay the entire centre if permitted to remain in it; the latter plan requires care, and the pans should be changed daily, as it saves the plant from getting mouldy, which it is prone to do at this period.

When growing, all decayed leaves and weeds should be removed.

As endive is grown for a two-fold purpose, either for salad, or decoration, the French mossy or white curled is the best for edible purposes, the Batavian white and green curled for the ornamental. It takes about fourteen days to blanch an endive, and economy may be practised by blanching according to consumption.

## THE CARDOON

*Cynara Cardunculus.*

A rich soil mixed with sand favors this vegetable. Its seeds should be planted four feet apart, two in each hole, in rows five feet apart. When the seedlings are a foot high, destroy the weaker of the two. June is a good month for sowing. Cardoons are blanched before becoming fit for the table, and they require to be earthed up for that purpose as high as possible. The inner leaves and bud are the edible portions.

When the plants are three feet high, they should be tied together. Ten days are required for blanching. The de Tours and Red cardoons are the kinds usually grown.

**CARROTS***Daucus Carota.*

Well-selected imported seed is required for a good crop. Acclimatised seed fails to give satisfaction, the roots fork and they soon get woody. The soil should be mixed with sand, and sown broadcast, on a calm day; the seed being so light is easily blown away. The soil should be deeply dug, the deeper the better, of a light sandy character, to enable the root to penetrate easily.

When the plants have four leaves, thin them out to four inches: these again may be thinned to ten inches, the space required for a full grown carrot.

The early and short horn kinds may be sown in the latter end of August. James's intermediate about the 15th of September, the long Surrey and Altringham, on the 1st of October.

Carrots of the horn character require less growing space than the longer rooted kinds: they also come to maturity sooner. By sowing seed as above stated, carrots may be had in perfection from November to the middle of June, when they may be taken up and stored in wood-ash and sand.

Water freely.

Weeds should be removed, as they impede the circulation of air, and absorb the moisture so necessary at the root.

When carrots are stored, the crown should be completely cut off, to prevent shooting of the leaves.

Carrots are sometimes planted on ridges. This can only be necessary when the soil is not sufficiently deep.

Carrot seed is very slow in germinating and may be accelerated by damping the sand in which the seed has been mixed, and allowing it to "chip" before sowing.

**CAULIFLOWER***Brassica Oleracea.*

In the Upper Provinces, it is a nice point of distinction whether imported or acclimated seed succeeds best. Although

the former is generally grown by Europeans, natives prefer country seed, and the large heads of this vegetable exhibited by them, frequently with a diameter of fourteen inches, proves the closeness of the competition.

In the Lower Provinces, country seed should have the preference, for imported seed cannot be so fully relied upon. Plants obtain a vigorous and rapid growth and promise well up to a certain stage, when they suddenly fail, possibly due to climatic influence, and when ready for cutting, they are found with small uneven heads of an indifferent color. Country or acclimated seed, on the contrary, has a steadier growth to the end and seldom disappoints the cultivator.

In the North-West, imported seed should be sown in boxes or half casks in the month of August,—the soil should be mellow and rich, carefully drained,—and placed under cover, with light and air. When the seedlings have four leaves, they should be removed to a second cask or box and placed at intervals of four inches: there they should remain until they have eight leaves, when they may be transplanted to their future homes.

In Bengal, acclimated seed is sown a month later. Beds for cauliflowers are made as for cabbages of the larger kinds: they are rank-feeders, and require heavy manuring. A weak solution of potash will add to their growth.

It is a good plan to grow a reserve of plants to replace those damped off, or otherwise destroyed. Many growers plant every third hole with two seedlings, removing the weaker when the purpose for which it was placed has been answered.

Earthing up gives strength and vigor to the stalk and should not be omitted.

Leaves, unless decayed, should not be removed. A later supply of cauliflowers can be had in the Upper Provinces by sowing seed in September; on raised beds, in the open air.

Water growing plants freely.



The best imported seeds are the Mammoth, Early short stemmed, Wakheren, Large Asiatic, and the Frogmore.

Good country seed may be obtained from many public gardens, that from Patna is well known. When the heads are forming, shade them from light with a leaf taken from the plant.

## CELERY

*Apium, Graveolens.*

Celery, in a natural uncultivated form, is to be found in a shady place by running water. Knowing its habitat, we must endeavour to imitate nature as closely as possible for its successful cultivation. We must take season and climate into consideration, and try to supply by art what we know to be essential in its wild state for its existence; therefore, in the month of February sow seed under shade; and as the primary object is to keep the plants in a backward state until the rains are almost over, the poorest soil should be selected; if hot winds prevail, water freely.

In the month of August prepare trenches running north and south, eighteen feet in length by two in breadth. Dig to a depth of three feet, throwing the earth on either side of the trench, and levelling, as this earth will subsequently be required for earthing up at a later period. Place in the trench eighteen inches of good well-rotted manure, above this, six inches of the soil mixed with sand to admit of the young roots penetrating easily to the black soil. About the 1st of September, select the most robust of the plants and plant them twelve inches apart. A second, third, fourth, and fifth trench may be prepared at intervals of fifteen days, taking care always to select the most advanced plants. By this method celery may be had in perfection for many months, even as late as June.

The plants should be earthed up when about fifteen inches high, then allowed to grow and expand as much as possible. Fifteen days before required for the table, earth up to within

six inches of the top, pack the earth as tightly as possible, to exclude light and air. Never use cylinders of any kind, as they tend to dry the stalk, making it stringy.

Water freely every fourth or fifth day, taking care that none is permitted to get to the heart of the plant, or it will decay. White celery is not recommended to be grown unless it is to be eaten very young, it being subject to attacks from insects, and the longer it grows the less flavour it obtains.

The red celery grows more luxuriously, has a larger head, and full flavour, with the great advantage of being solid.

The plan mentioned for growing celery has been tried for several years, and obtained first prizes at two Horticultural Exhibitions.

It is better to import fresh seed yearly, as seed even of the best kind is apt to degenerate.

The kinds recommended are Cole's crystal white, Incomparable white, Manchester giant red, Williams's matchless red, Cole's red.

## CELERIAC

### TURNIP-ROOTED CELERY.

#### *Rapaceum.*

Celery of this nature is daily becoming better known, although little used in India. The soil should be prepared in the same way as for celery, but the trenches should be but twelve inches deep.

Seed may be sown in July, in a shady place, and the young plants put out when about four inches high. As the root forms, it should be slightly earthed up, but earth should not be allowed to approach the leaves.

The distance between each plant should be eight inches.

Water daily.

The German system of growing this description is the best. A circle of earth is made capable of retaining water, in the

centre of which the root is placed, then filled with water, and kept constantly wet. The natural habitat of this vegetable is thus closely imitated.

## LETTUCE

*Lactuca Sativa.*

Sow in a well-drained pan under cover, accessible to light and air, in a light rich soil, imported or country raised seed. The latter can now be obtained in every respect as good as the former. The earth should be kept moist. When the seedlings have two leaves, remove them to the open bed, giving each three inches of room. Here they can remain until again transplanted. After each removal, water freely.

Seed may be sown from July to January, but the plants do not mature if planted out before October. There are two classes of this edible plant, the cabbage and the cos, subdivided into, perhaps fifty varieties. It will be sufficient to name the brown Dutch, the Drumhead, the Grand Admiral, the Large Roman, and the Imperial, as the best of the cabbage class: the Brown cos, the London white, the Paris white, and the Early Egyptian, for selection as cos. The artichoke leaved variety is peculiar, having a handsome foliage.

A full sized lettuce of the cabbage description requires a foot square of earth. The cos, ten inches only.

Liquid manure increases the size to a great extent, and should be given every ten days.

Frequent watering is necessary.

Cos lettuce should be tied up, for a few days before cutting, to blanch it.

## DANDELION

*Leontodon Taraxacum.*

Unknown and uncared for as a vegetable in India, it is a salad much appreciated elsewhere.

The peculiar properties of this plant are so suited to the population of tropical climates, that one is at a loss to understand why it should be supplied from the hand of the medical adviser in place of the gardener. It grows wild in most of the hill stations: in fact it is indigenous.

The shoots require blanching, before serving up.

## CHERVIL

*Scandix Cerefolium.*

The early tender leaves form a pleasant salad. Sow in a rich soil, covering the seed lightly. Give each plant nine inches of space. September, October, and November are the months for sowing.

The curled leaf is the only seed grown.

## GARLIC

*Allium Sativum.*

The medical properties of this plant have long been known to the natives of India. It forms an ingredient in many of their dishes, and is seen in consequence in most native gardens.

The soil required for this bulb should be rich. The usual method of growing is to plant a clove (this being one of the many divisions enclosed in the outer skin) an inch deep, allowing each plant a space of twelve inches. It is a peculiarity of the bulb to send up a stem with bulbs, in place of flowers. This should be pinched off, as its growth affects the bulb under ground.

Water freely.

The plant is matured when the leaves wither and the divisions of the bulb separate easily, when the outer cuticle is removed.

Plant the cloves in October.

## ROCAMBOLE

*Allium Scorodoprasum.*

One of the viviparous plants used as a substitute for garlic. It produces bulbs like garlic on the top of the stem: its cultivation is the same, with the exception that the seed bulbs are usually planted.

## CHIVES

*Allium Schaenoprasum.*

Unlike its class, the bulb never completely forms. At its best, it is but a poor substitute for onions: it is capable of being cut into any device. When growing it makes a good border, and is propagated by division of its roots.

Plant in November.

## CIBOUL

*Allium Fistulosum.*

The Welsh onion of very strong taste. As it never forms a bulb, it is of little use.

A light rich soil is required. It should be sown in October in drills, five inches apart, just covering the seeds with fine sifted earth.

## SHALLOT

*Allium Ascalonicum.*

Should be grown as onions; the seed planted in October. If propagated by bulks, plant in November. Three inches is sufficient space for each plant.

## CUCUMBER

*Cucumis Sativus.*

Unlike most vegetable seed, the older they are, the stronger the plant. The best imported seed should be obtained from plants grown in the open air. Those from frame cucumbers are of little use.

Seed should be sown in a box in February, covered very lightly with leaf mould. When they have put out a strong leaf, nip off the stem above the leaf. In two or three days after this operation, they are ready for transplanting.

For a bed, dig a circular hole with a diameter of twelve inches. Fill this up with a mixture of sand, garden soil, leaf mould, and well-rotted manure, in equal portions. The depth of the hole should be twelve inches. In this bed place three plants in the form of a triangle, four inches from each other. When planted, press the earth around them, and give a liberal supply of water.

Disappointment may often be expected with imported seeds. They appear to be ill-suited to this climate.

There are upwards of twenty varieties of this vegetable; Carter's champion and the Black spine are perhaps the best. The cluster gherkin may be grown for pickling.

When cultivating the indigenous seed, the male blossom should be nipped off, leaving but one or two. The vine also should be cut off at the top, as soon as two or three cucumbers have set.

Sprinkle wood-ash over the young plants to protect from insects; a thorough dusting on and below the leaf is necessary. A good turf fire, giving volumes of smoke enveloping the plants for an hour or so, renders the leaf unpalatable to the red beetle. For a time water freely, never allowing the soil to become dry.

## SQUASH

### *Cucurbita Meloepo.*

Prepare soil in a circular hole as laid down for cucumber. Place three seeds in each, in the month of January, near a hedge or wall; allow the plants to trail over. Water freely. When the plants are twelve inches high, weed out two. The best kind are the Turban, Boston marrow, and Yokohama.

**TUBEROUS ROOTED CHERVIL***Chærophyltum Bulbosum.*

A bulb daily coming into favor, as forming an agreeable variety of the tap-rooted vegetables, possessing the color peculiar to the parsnip, with the flavour of the chesnut. It may be cultivated as laid down in the directions for carrots. It takes four months to mature.

**SPINACH***Spinacia Oleracea.*

Cultivated solely for its succulent leaves. A light rich soil is required for this plant, in an open unsheltered position. A bed six feet by six is a good size, and will hold as many plants as a small family will require. Each plant requires a space of ten inches.

Seed should be sown broadcast, and lightly turned in with a rake.

When the leaves are fit to gather, cut off the outer only, letting those on the crown continue to grow for another supply.

Water freely.

There are three varieties of spinach, the oblong triangular, the Flanders or largest leaved, and the round leaf, bearing smooth seed. The Flanders leaf is considered the best, as the plant is diœcious. The most perfect seed is obtained from the largest growers, such as Hooper and Co., Covent Garden.

Seed may be sown in September, October, or November.

**NATIVE SPINACH***Amaranthus Oleraceus.*

This and the red variety are in general use with natives. They are grown in the rains and little appreciated by Europeans as a vegetable, but some of the kinds have variegated leaves and form pretty garden borders or pot plants.

## WATER CRESS

*Nasturtium Officinale.*

In many of the Himalaya mountain streams, water-cress may be found growing. Running water is best suited to this plant. In the plains it may be cultivated from seed or cuttings placed in the garden water-courses, somewhat sheltered from the sun. A gravelly soil, allowing the roots to penetrate easily, is desirable. The plants flower and seed freely, and there is little difficulty, with a good supply of water, in obtaining cress for many months. In the rains the plants are likely to become crowded with weeds—these should be removed.

## GARDEN CRESS

*Lepidium Sativum.*

Sow during the cold weather every fortnight, and cut when three inches high. A glass frame placed over the bed prevents it from becoming hard. Water freely. A good light soil is best. There are three kinds, plain leaved, curled leaved, and broad leaved.

## MUSTARD

*Sinapis Alba.*

Imported or country grown seeds are equally good. Sow broadcast upon a light soil, and cut when three inches high. It may be grown nearly the whole year as a salad. If raised for seed, sow in the month of October.

## AMERICAN CRESS

*Barbarea Præcox.*

Seed should be sown lightly either as an edging, or border, or in beds. Each plant requires eight inches as growing room; the leaves are ready for use when four inches long: they may be cut frequently. As this plant is only a substitute for water-cress, it will seldom be grown for edible purposes.



## BEAN

*Phaseolus Vulgaris.*

Flood a moderately sized bed, composed of a rather stiff soil, in which very old manure has been previously mixed. When the earth is sufficiently drained to admit of its crumbling in the hand, mark the bed out with the line, and prepare rows, two feet apart.

Select some of the best varieties of seed, such as the Negro, Early dun, Haricot, Red French, or that beautiful and prolific kind under the name of the Yellow Australian; then place each seed twelve inches apart, an inch below the soil. It should be so arranged that two plants in adjoining rows are never parallel. For the sake of maintaining uniformity in the rows, a few beans should be planted at the same time at the end of one or two rows as a reserve, to replace those that fail to germinate or may be eaten off. They should be transplanted with their roots well covered, to prevent the earth falling off. Water a few hours previously.

For a speculative crop, sow in July or August; for a certain crop, in October and November, and again in January. In the hills, April.

Never allow the soil to cake: it should be raked over two days after watering the plants.

## EGG PLANT

*Solanum Melongena.*

There are three kinds of Aubergine and several varieties, originally an African fruit, now acclimated and extensively cultivated as a vegetable, and used alike by all classes in India. The white kind is, perhaps, more generally supplied to Europeans, but it has no advantage over the purple or green.

This plant has suited itself so well to the climate of India, that there are very few months when its fruit is unobtainable.

It may be propagated by seed or layers. The former may be

sown from October to May; the latter taken from strong shoots: the usual tongue is made, and the branch pegged down. In fourteen days rootlets will have formed, when the plant may be taken from its parent.

The fruit from layers is smaller, as well as earlier, than that of seedlings.

A rich soil and a liberal supply of liquid manure at the time of fruiting are desirable.

The black Pekin is a variety much spoken of.

The green Thibet, Giant white, and the Scarlet are thought much of in France.

Each plant requires two feet to grow in, they should be planted in rows, and carefully weeded.

## MUKKA OR INDIAN CORN.

### *Zea Mays.*

This vegetable enters largely into native consumption and forms to a limited extent a staple article of food among the poorer classes when in a green state. Of the several varieties grown, perhaps the large yellow should have the preference; next to this the white.

A succession of crops may, in most stations, be kept up by planting every month from May to January; the more advanced the season, the smaller the heads become. Good rich soil is apt to make the plants go too much to leaf and stalk, a tenacious moderately-manured spot should, therefore, be chosen, and the seeds placed in rows, about fourteen inches apart, giving each a space of seven inches. Where a small quantity is only grown, it is usual to bind several plants together, tying them with their own leaves, as they are occasionally blown down, especially after watering. It is a good plan when the roots appear on the surface to earth them up. Frequent watering is necessary after the rains have ceased. Parrots cause great havoc when the grains have formed, unless driven off.

'The best varieties are the early Canada, Yellow popcorn, Vilmorin's new African, and the Boston ten<sup>th</sup> week. The Mal-da is also thought a good kind. .

## KOHL RABI

*Brassica Oleracea Caulo-rapa.*

A very rich, heavy soil is essentially necessary to produce this vegetable, of late years so much improved in quality and shape. Seed should be obtained from well grown roots uniform in shape, with few leaves. This esculent is well suited to this country, where it obtains a fabulous size. Epicures however prefer it when it is about the size of a small stone turnip.

Seed may be sown in September, in beds, in the open air, and plants may be transplanted to beds or ridges when they have four leaves or sooner. Each plant requires a distance of fifteen inches, and the ridges must be twenty inches apart.

Water as for turnips.

Seed must be imported. Formerly the ordinary stock consisted of large purple and the large green, but the varieties are increasing yearly.

The stems of this root must remain uncovered and weeds carefully removed.

## THE LEEK

*Allium Porrum.*

To grow this vegetable, prepare a small bed richly manured, slightly raised. In this sow, broadcast, fresh selected seed, and cover it in with a koorpee or trowel; or it may be raked in, and covered with a thick layer of sifted earth. This should be done in the month of October. When the plants are eight inches high select those with the stoutest stems for transplanting. These should be placed in a bed eight feet by six for convenience of watering, and placed in five rows, with a space between each of twelve inches. Care must be taken at the time

of transplanting that each plant is taken up singly, with as much earth attached to it, as will cover the fibres of the root. When the rows are lined out, take a dibble or stick having a diameter of two inches, and bore holes ten inches deep, at intervals of six inches, in the centre of which place with the left hand the plant, and with the right gently press around it some fine two-year old manure from stable litter. Water at once to set the earth. If the manure is too fresh, the plants will grow weedy, and require stakes for their support.

The tops should be trimmed monthly to swell the necks. For the edible portion of the plant, liquid manure is desirable.

Plants left in the seed bed may be allowed to grow, but they will never attain the size of those transplanted. Leeks should be blanched by earthing up at least three weeks before pulling.

Seed may be obtained by supporting the flower stems until the heads open out in flower. When the seed appears in the husk, cut the head and preserve in a dry place, exposing, before sealing up, to the sun for a few days on a tray.

The kinds usually grown are the large London flag, Mussulburgh, and the Ayrtoun Castle.

## GARDEN OR LEMON THYME

### *Thymus Vulgaris.*

The above named aromatic herbs may be propagated by seed cuttings, or division of roots. They require a well drained soil, and ordinary garden earth.

Seed may be sown in October, in pots, or beds. If required to stand the hot weather, it must be sown in pots, and these sunk in the earth when the plants are four inches high, and taken out of the garden at the end of March and placed in a shady spot. The earth around this spot must be frequently damped, and the plants themselves kept moist but not wet.

In the rains they require but little water. If they survive until October, empty the pots of their soil, divide the roots for fresh plants, and trim the straggling branches for cuttings. When this is done, re-pot the old plant, and place all in the shade for a week. To prevent disappointment, for, with all the care taken, these plants will frequently not live out the rains, it is as well to have a reserve of plants to take up for drying. This should be done in April, by pulling the plants up root and branch, and gradually drying them on a tray in the open air, not exposed to sunshine. When the leaves are crisp, place them in an air-tight vessel.

## SWEET MARJORAM

### *Origanum Marjorana.*

O. Marjorana, the summer variety, is an annual, and can only be grown from seed. It requires a very light ordinary garden soil. The seed should be sown in a bed, and a second should be prepared to receive the pricked out plants. Select a position open and airy. Seed should be sown a quarter of an inch deep in the month of October. When the seedlings are four inches high, thin out to seven inches for each plant.

O. Onites, or the common marjoram, is a perennial, and may be propagated in the months of October or November from seed, root divisions, or slips. It is extremely hardy, standing heat and rain.

Slips and root divisions should be placed out in rows with a space between each of six inches. Give each slip or root nine inches. A portion of the surface earth should be changed yearly.

Water occasionally.

The O. Heracleoticum, or winter kind, is also a perennial, and may be grown as the O. Onites. The above plants should be cut for use before the buds open, then gradually dried and stored for use.

## MUSHROOM

*Agaricus.*

The edible mushroom has its cuticle of a whitey brown color, its gills of a pinkish hue when young, and inclining to a dusky brown when old.

Mushroom spawn is obtainable in bricks, or by spontaneous generation in the open air. We know of no better plan of growing the mushroom than by making old beer barrels serve as beds for them. The barrels should be cut in even halves, one-half for the soil, the other for a covering. The lower half should have holes of an inch in diameter in the bottom and a few round the sides, the latter fitted with corks to regulate the temperature within. This method obviates the necessity of the old test sticks that caused so much damage to the roots.

To prepare the bed, place at the bottom of the cask a layer of good earth, above this a layer of fresh stable dung. Beat this down with a mallet, add another layer of earth, then another of litter, beating this as before, then add a third layer of each. Leave a space of four inches from the top of the half cask, and allow the whole to remain for fourteen or sixteen days. By this time the temperature will be on the decline, and when it reaches between 45 and 60 F., break the bricks into pieces of three inches, and place them in tubs at distances of fifteen inches from each other, above three inches below the surface. Hammer the surface as hard as possible, then add three inches of good soil, and cover with litter and the other half of the cask.

Mushrooms generally take six weeks to fit them for eating purposes. When ready, they should be carefully cut off with a knife, not broken, as the roots are thus seriously impaired.

Mushrooms form a very large article of consumption in France. Robinson informs his readers that a proprietor lost himself for three days in his mushroom cave. This is probable,

as a cave at Mercy contains twenty-one miles of beds, and produces three thousand pounds weight daily.

Mushrooms may be grown in old buildings, in beds made in layers, as above stated.

## ONION

*Allium Ceba.*

The country varieties of this bulb cannot be compared with the Continental, but as there is a difficulty in growing a Spanish or Portugal onion of any size worthy of the name, or producing a Madeira with its mildness and delicacy, those most adapted to the climate should be grown.

The seed, whether country or imported, must be fresh, as it deteriorates rapidly when left exposed to air or damp.

Seed should be sown broadcast in a bed specially prepared. When sown, gently rake over.

Ordinary garden soil, well mixed with sand, finely powdered old mortar, and wood-ashes, suit this bulb.

The space required for each onion of the smaller kind is five inches. Of the larger kinds, as the Tripoli and Portugal, ten inches. Weed out to this distance all superfluous plants. They may also be grown in rows, giving a distance between each of six inches, with the same growing space as already named for each bulb. Transplanting may take place when the plants are six inches high; the bulb portion of the plant must not be deeply buried. The bed or row should be well watered when all are transplanted.

Acclimated seed may be furnished from the garden by planting in September a well-selected full grown bulb. This will seed in a few months. The seed should be allowed to fully mature, and the head should be covered with muslin, when nearly ripe, to prevent birds from attacking it.

The soil should be kept moist until the stems begin to wither.

Onions should be exposed to sun and air for a few days after being taken up, laid out singly. If allowed to touch each other, they are apt to sweat, and that portion of the bulb is the first to rot.

Onion seed should be sown in September or October at the latest, as it takes six months in growing to maturity. Of the kinds best grown of imported seed may be named, Reading, James's keeping, Deptfort, and Danvers's yellow. The silver skinned is the best for pickling.

The Patna has the reputation of being the best acclimated seed.

## PARSLEY

*Petroselinum Sativum.*

One of the biennial herbs, but seldom grown as such in India, as it seldom survives the rainy season when planted in the garden.

Seed may be sown early in October. It takes nearly three weeks to germinate. It should be sown in a bed broadcast, and raked in. The soil should be slightly damp (from a previous flooding) at the time of sowing. When the seedlings are three or four inches high, thin out to nine inches apart: the closer plants are together, the less they curl. There are two kinds, the plain and the curled leaf. The best seed is Hooper's treble curled leaf and the Hamburgh large root. The root of the parsley can be boiled and eaten as a substitute for parsnips. Parsley is very grateful for a few waterings of liquid manure.

Seed also may be sown in pots in April, but no great expectations must be anticipated regarding the result; weak delicate plants with a few leaves reward the sower.

## PARSNIP

*Pastinaca Sativa.*

This neglected root, so seldom seen in an Indian garden, requires only to be better known to have its cultivation large-



ly increased. None but imported seed of the freshest kind should ever be sown.

The soil required for this esculent should be light and sandy, well mixed with very old manure, and dug to a depth of three feet, all lumps finely pounded and stones removed. A free open spot should be selected. At the time of sowing, the seed should be mixed with coarse sand, slightly damped to prevent its being blown away, as well as to facilitate the germination, as it takes a long time before it makes its appearance.

It can be planted on ridges three inches high, nine inches apart, or sown broadcast.

Seedlings should be thinned out when four inches high, leaving each plant a space of nine inches to mature in.

Seed should be sown early in October. Young plants require frequently watering. The Jersey marrow and the Student are the best kind of seeds and the most extensively grown.

## SAGE

*Salvia Officinalis.*

The most satisfactory way of growing this herb is to make a pot herb of it: a large gumla or earthen pan should be obtained, then half fill with stones and charcoal, filling up to an inch of the top with good rich earth. In the month of October plant the seeds. When they are an inch high, thin out to six inches. The plants should be pulled up by the roots in the month of April, and dried in the shade for future use. The foreign variety seldom survives the rains. The large bush known to the native gardeners as sage is a good substitute for the imported kind: the leaves bear strong resemblance, but the aroma is stronger and the flavor less delicate.

## MINT

*Mentha Viridis.*

The above-named herb is a different variety to the ordinary poodeena of the Indian garden; the latter appears to be in-

dispenous to the country and grows well in all stations by slips. The only attention necessary is in the rains, when it will rot off unless the ground is highly drained. A raised bed is the best on this account.

The spearmint usually fails in the plains.

## PEAS

### *Pisum Sativum.*

This favorite vegetable is in endless variety, and the kinds selected must, in a great measure, depend upon taste. They are well suited to follow an exhaustive crop, and never require manure; a sandy light soil, such as one finds on the banks of rivers, is the pea's delight. Peas are divided into three classes, sometimes into four, but the latter division must depend upon the length of each cold season. In the North-West, at the most the third division can be carried into effect; in Bengal but two, while the Punjab may enjoy all. Of the early varieties we know of no better kinds than early Emperor, Dickson and Hooper's early rival. The medium for mid season will comprise Champion of England, Dwarf, Mammoth, Prussian Blue, and Yorkshire hero. The late kinds include British Queen, Waterloo or Victoria marrow, Hooper's incomparable, and Veitch's Perfection. The late kinds, although so rich in quality are not recommended, for they seldom come to perfection, one hot day's sun destroying plants of the highest promise. Dwarf peas should be sown in double rows, two inches deep, at intervals of one inch, with a distance between the rows of eight inches: they should be supported on twigs when they have obtained the height of eighteen inches. Peas of medium height require to be sown in double rows, as above, with a distance of twelve inches between the rows, and should be supported when two feet high. The high growing peas require to be sown at an interval of one and-a-half inches from each other, in double rows, with a divisional space of sixteen inches, and require supporting when thirty inches high.

It should be remembered that peas require air and light, consequently a space of four feet should separate each column of peas of a dwarf kind, and six feet those of the highest growth. Water freely by flooding, more especially when in flower. Peas may be sown at the latter end of August, and continued weekly, or every ten days, until January or February, though the latter month will seldom answer in those stations visited by hot winds. If the weather is very dry when sowing the seed, soak previously in water for some hours. When in blossom it is well to nip off the leading shoot, as it will hasten to setting of the pods. Be careful, when gathering, not to injure the stems, it is therefore wise to use scissors. Many fine varieties of peas have been raised by Mr. Thomas Saxton: Alpha, William the First, Supreme, sent out in 1868, and Superlative, sent out in 1872, appear to have taken many first prizes at the chief Horticultural Shows in England. The pods of Superlative have been exhibited seven inches in length.

## POTATOE

*Solanum tuberosum.*

This esteemed tuber, now so extensively grown in the hills and plains, owing to the non-importation of fresh seed, is rapidly exhausting itself. This is self-evident from the degenerated kinds daily met with.

A potatoe is said to have a limited existence, after which time it ceases to be of value as an article of food.

To grow this tuber successfully, it is essentially necessary that the cultivator should have a knowledge of its chemical properties. A perfect potatoe has two per cent. of mineral matter, three per cent. of albuminous matter, seventy per cent. of water, and twenty-five of saccharine matter.

The soil should be composed of old stable manure, lime, sand, and bone-dust, mixed with ordinary garden soil. This combination contains the phosphates upon which it feeds.

To ensure large potatoes, it is usual to plant large seed, as the starch, which is at this period the life of the plant, feeds the stem before the roots have had time to germinate.

The time for planting potatoes in the hills is March; in the plains, August, for country seed, and September for imported. Planting a second year in the same soil gives a larger crop.

Seedlings should be placed in trenches, nine inches deep, and at intervals of fourteen inches if of country seed: and thirty inches when of the nature of the Climax or other imported prolific varieties. Trenches for country seed, fourteen inches apart; other kinds, twenty-four inches. The distance for imported seed may seem to be excessive, but when one tuber often produces over eleven pounds, the necessity for space will at once be seen; the end of the potatoe showing the greatest number of eyes should be placed upwards, and when planted, cover in the trench with earth.

Potatoes require to be well earthed up and the stems or halms protected from damage, as the tuber is but an enlarged prolongation of the halm used by the leaves and roots as a repository for their respective collections. The loss of a stem is of consequence, as it cuts off a channel of supply, which decreases the size, and very often renders the tuber misshapen.

Planting in sets is seldom done in the plains. No potatoe should be cut for this purpose unless of a size equalling a half-grown Malda mango. In the hills, "sets" are always planted.

Two eyes only should be allowed to each piece.

The land must be well drained, otherwise the leaves will curl and have a blighted appearance.

The male cricket and cockroach are very destructive to seedlings. It is advisable to protect them by placing wood-ash under them.

The Early rose, Late rose, Fluke kidney, Carter's champion, Breese's prolific, and Hooper's superb climax are usually grown.

Layering the halms is the new method of propagating.

**. RADISH***Raphanus Sativus.*

Prepare a soil moderately rich, and have it dug with the spade ten, twelve, or fifteen inches, according to the description of radish to be planted, whether of the turnip, long-rooted, or Spanish varieties. All stones and obstructions must be removed, and the earth broken as finely as possible. Use imported seed, and select, for the long roots, the Long salmon, Beek's scarlet frame, and the Purple shot tops. For the turnip kind, the French breakfast, the Early scarlet, the China, rose, and the Turnip white.

The Spanish varieties, consisting of the black and white Radish, may be grown throughout the cold season. The last crop must have a northern aspect, and be sheltered from the mid-day sun. Seed may be sown broadcast or in drills. If the former, thin out when the plants have six leaves, (the leaves of the discarded plants are excellent for salad) allowing a growing space of four inches for long roots, six for the small turnip, and eight for the Spanish kind.

When sown in drills, which is preferable, allow the same distance between each drill as required for the growing space already stated.

The longer a radish is permitted to grow, after three weeks, the less fit it becomes for an esculent.

Water freely, or the root will soon become hard and fibrous.

The long-podded radish is a variety that should be tried, the pods have an agreeable flavour, when boiled are an excellent vegetable; the root, when very young, can be eaten as an ordinary radish.

The Mammoth Californian radish, with white flesh, is highly recommended, as being mild and solid.

The native variety of this vegetable has many good points, but inferior to that raised from imported seed.

## SALSIFY

*Tragopogon Porrifolium.*

This plant is grown either as one of the many substitutes for asparagus by blanching in the usual manner, and boiling its vigorous stems or shoots, or to form an addition to the tap-rooted class of esculents, as carrots and parsnips.

This edible cannot be grown to satisfaction where the cold weather is at its minimum, as in Bengal.

The seed should be sown in drills, in moderately rich soil, well and deeply dug. Never transplant, but thin out to a distance of four inches; the drills to be eight or ten inches apart.

October is the best month for sowing in the Punjab; and November in the Central Provinces.

## SKIRRET

*Sium Sisarum.*

A root well suited to the Upper Provinces, to be grown as Salsify, the tubers should be planted ten inches apart, at a depth of six inches. The plant is propagated by division of its tubers.

## SCORZONERA

*Scorzonera Hispanica.*

A good rich soil is required for this root. It grows freely. Seed should be planted in October.

It does not bear transplanting well; thin out, allowing ten inches to each plant; the roots remain fibrous for nearly a year, when they soften, become fleshy, and tender. When boiled, they resemble chesnuts.

Fresh seed is indispensable. Country seed frequently fails. When taken out of the earth, they may be preserved for a considerable time in dry sand.

## TOMATO

*Solanum Lycopersicum.*

This fruit is now widely known, and as extensively cultivated, not only on account of its usefulness, forming as it does one of the most agreeable of our vegetable productions, but for the beautiful ornamentation it is made to assume by skilful horticulturists in the gardens of the Continent of Europe.

Tomatos grow well in ordinary soil, and require no high manuring.

The seed for the smaller kinds, such as the currant, the red and yellow cherry, the plum and the pear-shaped, may be sown in boxes or earthen pots in July or August. The seed should be lightly sown, and covered over with sifted earth. When about six inches high, they may be planted out into beds, or retained in pots. If in the bed, the distance between each should be two feet. When the plants have obtained a fair height to require supports, place them in hoops made of bamboo, fastening the hoops to stakes of the same material or galvanized wire. The system of allowing the plants to fall over small branches, placed on the bed, has this disadvantage, much of the fruit remains undiscovered and is wasted, and the bed has an untidy appearance. By using hoops the plants are able to get air and light, two essentials for the production of good fruit.

Fruit of the larger kind as the General Grant, Charter oak, and the Trophy, may be sown in September or October. They may be made to add to the beauty of the garden, by planting them, three feet apart, on a trellis-work. When in fruit, they form a very pretty border.

It is thought a good plan to pinch off the leaders when the fruit begins to set.

The fruits should be cut off with scissors.

The earth should not be allowed to cake round the stalks, on any account—it excludes air. Water freely.

Tomatoes have been known to weigh a pound and-a-half, and to measure in diameter four and three-quarter inches.

Layering is a practice common with native gardeners. A tongue is made in a stout side-shoot or branch pegged down and covered with earth and removed when fairly rooted.

## TURNIP

### *Brassica Rapa.*

These wholesome and excellent vegetables are grown either for their roots or their tops, and as perfection in both qualities are not found combined upon one plant, those known for their special peculiarities will be individually named.

Of the kinds most noted for their roots as an article for table consumption, preeminently must have the choice those of the stone description, such as the Early, the White, and the Black skin, Hooper's improved nonsuch, and Snowball must not be disregarded.

The Orange yellow, though of approved flavor, will not be a favorite on account of its color.

The Swede is the only turnip deserving the name of the edible leaved. Its root is valueless except as food for cattle, when other fodder is unobtainable.

Imported seed is desirable, the fresher the better chance it has of turning out well.

A rich light soil previously dressed with salt, is, perhaps, the best home the seed can have.

Seed may be sown broadcast, or planted on ridges. The latter method is preferable if the rains continue late.

All young plants, when they have four leaves, may be transplanted without danger. Turnips require twelve inches of soil, the more air and light to the leaves the better; the root itself should always be kept covered with soil.

The time for sowing seed is the beginning of September. For a late crop, the middle of October.

Frequent watering necessary.



Turnips, are very liable to the fly. Dusting the leaves with wood-ash and putting a coating of the same beneath each, to receive them as they fall; it will destroy them in a few days.

## VEGETABLE MARROW

### *Cucurbita Orifera.*

Select for a bed, a light rich soil, open to air and light, with a south-west aspect. Place over this bed a layer of good rich manure, and allow it to remain until a week before the plants are ready for transplanting, when turn it in, breaking up the ground into fine powder.

In the month of January plant some well selected seed from an approved variety, and plant it in a box, leaving a space of three inches between each seed. When the seedlings have four leaves, they are ready for transplanting. They must be removed with as much earth to their roots as possible. Place each plant in the bed at intervals of seven or eight feet. When they have grown three or four feet, peg the shoots down, covering the joints with earth as they throw out rootlets at these places.

Water abundantly.

The Mustard marrow is the best, and the others to select from are Long green marrow, White marrow, and Hibberd's prolific. The last-named is a dwarf variety.

## YAMS

### *Dioscorea Batatas.*

A club-shaped root, much grown in China, from which country it was probably brought, and introduced into India. It has, when growing, a long twisted stem, and heart-shaped leaves, very ornamental when young. It frequently grows to a height of twelve feet, requiring strong supports for its stems. It may be grown also creeping over the bed. This method

is objectionable, as it forms an entanglement, and injury is frequently done by porcupines and jackalls, breaking the stems.

The plant is propagated by cutting a good root into sets, like potatoes, leaving each piece with two eyes. These should be planted with the eyes upwards, two inches below the surface, allowing a growing space of fifteen inches for each plant.

The land must be well drained, as standing water is fatal; the soil of moderate richness. The root grows like the carrot and needs depth of soil easy of penetration. Plant in May in Bengal; June and July in the North-West Provinces. There are several varieties of yams.

## THE FLOWER GARDEN:

### ITS

#### *Arrangements and Ornaments.*

1. *Approaches and Walks.*—In laying out an approach to a house, where space permits, it is well to avoid straight lines. Should the entrance to the compound be opposite the house, the road may diverge to either side, sweeping round in a curve to the door. Frequently the road is a little in advance of the house, forming a portion of a circle in its course to the entrance or portico; another simple form is the double entrance, describing a half-circle, the house being reached by either of the roads that sweep round to the dwelling. But whichever design is adopted plant trees on either side of the roads. If quickly growing kinds, such as the neem, suhujna or horse radish tree and bukayun, an avenue will soon be formed, pleasant and shady, as well as ornamental. A carriage drive should never be less than fifteen feet wide, even twenty-five will not be excessive.

The ground in front of the house may be designed to any shape wished, but space should be left for a carriage to turn

easily. Some prefer this metalled, others form a grass centre, with the drive round it. If the space will admit, the grass plot can be used as a croquet-ground. The main walks of a garden should never be less than four feet wide, curving and graceful, and of as bold a character as the size of the garden will permit, and one such walk of a good width has a better effect than two or more of a straight or zig-zag description, bending and twisting in all directions.

All curves should embrace as many natural obstacles as will not obstruct the drive or walk. Where these are wanting, artificial should be made, as a flat even surface has a monotonous appearance.

The straight formal walks usually seen in Indian gardens may be made less unsightly by judicious planting; thus a wide walk on one side of the garden, screened from the public gaze by a thick belt of kurunda bushes or other thick-set hedge, will break the uniformity and afford a shade often welcome.

2. *Hedges*.—A hedge is by far the prettiest boundary. For the outer hedge adjoining a public thoroughfare, where it is necessary to form a protection against the inroads of animals, the American aloe and the prickly pear may be advantageously planted. Where this is not an object, mendhee or dodonca form a cheerful green hedge: either may be used exclusively. During the hot weather, if watered occasionally, they will retain their refreshing verdure. Jait may be grown as a temporary hedge until the two latter are sufficiently advanced, when the jait should be removed. These are the kinds of hedges usually seen in the plains. In the hills the purple hibiscus is frequently used, and has an ornamental appearance and grows quickly. Rose hedges are beautiful, and are generally formed of pink or crimson China roses or the sweet little rose-de-mœux: they require frequent watering in hot stations to keep them in leaf. In Deyrah Dhoon, they form one of the great beauties of the place, and are seen in great

profusion, by the side of roads and houses. There is one choice small rose garden in the Taj Gardens at Agra, enclosed with a hedge of white roses and scarlet passion flowers, perfectly lovely when in bloom.

3. *Borders*.—In these, many permanent objects may be introduced with advantage. Shrubs, flowering and ornamental, besides their individual beauty, form a pleasing back-ground for the low growing flowers. Roses should be freely planted in borders, and by side of the water-courses where they flourish luxuriantly, and give but little trouble in the way of watering. Gardenias, myrtles, petunias, phlox, stocks, asters, poppies, oleanders, gladioli, hollyhocks, heliotropes, mignonette, tropæolums, chrysanthemums, poinsettias, and many others are all suitable, taking care to arrange the higher growing plants nearer the back-ground of shrubs, placing the smaller ones in front.

4. *Banks*.—Banks covered with flowers and shrubs in a sloping situation may be made very ornamental, and are very useful in shutting out an unpleasant view: they also afford shelter against cutting winds. Plants of a prostrate habit, such as portulaccas and verbenas look pretty, spreading over it and concealing the soil. The juniper is very effective in such a position.

5. *Lawns and Croquet Grounds*.—Nothing adds so much to the beauty of the garden and grounds as the refreshing green of the lawn. The ground selected should be well dug, and all hard substances removed. A quantity of fine old manure should then be mixed, the whole then be well beaten down, rolled, and the surface made even. The ground should have an imperceptible gradient, the highest portion of which should be nearest the water channel: this will admit of the water flowing freely and evenly over the grass, without making cuttings or small holes. Grass seeds may be sown broadcast, and rolled in, but this method is not advised, as imported packets contain other seeds, with objectionable tap-roots, pro-

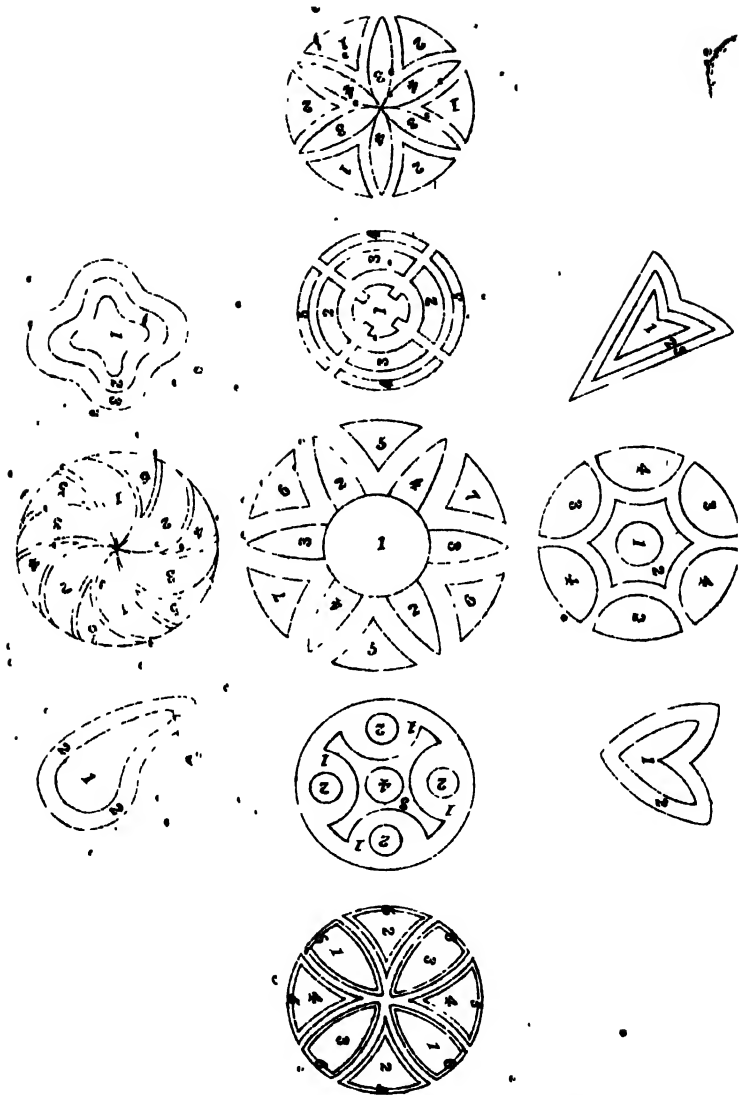
ing a source of much trouble in endeavouring to eradicate them. These are best taken up with a fork, and a bare uneven spot will mark for sometime the home of the intruder. The grass known in this country as doob is preferable, as the eye can at once discern, and the hand select, all that is suitable for planting.

To plant a lawn with doob, lines should be drawn about six inches apart over the whole surface, and at intervals of four inches, small portions of the roots of the grass may be inserted in a slanting direction. These should be at once watered, allowed to remain for six days, then rolled and again watered. As the hot season advances in the North-Western Provinces, the grass must be occasionally flooded; in the months of April, May, and June, every fourth or fifth day, will not be too often. The grass may be flooded by means of an India-rubber tubing, or a canvas hose, connected with the channel of supply, which should have a slight elevation. A small hand force-pump, with the suction pipe placed in a half tub, filled by manual labor, is a very effective way of watering. In this case a fine spreading rose must be attached to the hose or tubing to prevent inequalities, which a large body of water, under the influence of force, of necessity must make in the earth.

The quickest way to cover the ground with grass is to chop the roots of the doob very small, and having mixed them with mud and cow-dung, spread a coating of the mixture over the whole surface of the intended lawn.

A liberal dressing of liquid manure should be given every three weeks, when the grass is kept closely cut as for croquet purposes. After the rains the whole plot should have a quarter of an inch of good leaf mould sifted over it and rolled in. The mould should be dry or it is apt to cling to the roller; the grass should then be allowed to grow for three weeks. At this time any bare places may be re-planted. If shears or a scythe is used for cutting the grass, it must be rolled





*Geometrical design for Flower Gardens.*

before cutting, as well as after. The patent grass mowers with rollers should be used when practicable. Care is required in adjusting the blades to prevent their cutting the roots, or scraping the earth, or the beauty of the lawn will be destroyed. A flower border round a lawn has a pretty effect, but when the plot is used for the double purpose of lawn and croquet, a galvanized netting will be necessary to protect the flowers. Trellises covered with creepers are very ornamental, as well as desirable, in exposed situations.

## CHAPTER I.

### *The Flower Garden.*

6. The ordinary flower gardens attached to most Indian houses present but little variety, and are usually in the geometrical style, consisting of depressed beds surrounded by raised walks. These are easily flooded, and by planting permanent flowering shrubs, and tastefully arranging the colors of annuals or other plants chosen to fill the beds in the cold season, may be made at that time of the year very gay, while the shrubs will prevent the garden ever looking quite desolate in the hot season.

If masses of colour are preferred, shrubs may be dispensed with, and each section filled with one color only, the centre being different from the rest. The divisions should be arranged in pairs, so that those opposite each other have the same colors. Geraniums, either mixed or scarlet alone, are very handsome for the centre bed, and may be sunk in the pots in which they are grown, or planted out in the soil; then plant two beds with white verbena, two yellow calceolaria, two blue lobelia, two scarlet verbena, and two mauve verbena, which will give a brilliant effect. Some experience is necessary to have all in flower at the same time, but the care and patience bestowed will be amply repaid by the display produced.



The following arrangement is also effective : A centre of either crimson or yellow roses, pegged down (for which operation, directions will be given in the Chapter on Roses.) This may have a drooping white rose in the centre and an edging of white verberna, mignonette, blue nemophila, or the pretty striped ribbon grass, if preferred ; but the simple bed of one kind of rose looks well, then the pairs of beds may be filled with scarlet Tom Thumb Nasturtiums alone, or mixed with Crystal Palace Gem, white petunias, blue nemophila, yellow escholtzia, purple petunias, and white nemophila. If another pair of beds is required, of course any of these can be omitted and other flowers substituted. Dwarf double scarlet or rose colored poppies make a most brilliant bed. If the beds are fewer, the centre of the beds may be one color, edged with a flower contrasting well with it. Scarlet verberna edged with white verberna, yellow escholtzia or calceolaria, edged with blue lobelia, are examples ; or the centre of the beds may be composed of various flowers, still planting an edge of one color, the pretty borders of purple or yellow crocus so often seen in England, and those of the pink and white swamp lily, in the hills, are very effective illustrations of this style. When the trouble of keeping it in order is not considered too great, a grass setting to this kind of garden greatly adds to its beauty. Should a less formal arrangement be preferred, round beds, cut out in the grass, are very pretty. The rose beds on the grass in the Cawnpore Memorial Gardens are charming.

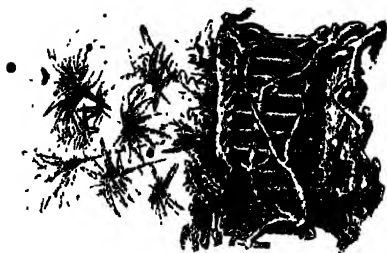
7. *Baskets and Vases.*—A wire or trellis-edging to the beds transforms them into baskets of flowers, and the lovely *Ipomea Rubra* *Cerulea* grown over the edge of the basket, the centre being filled with balsams, is much admired. Crimson passion flowers surrounding white roses, or a pale colored passion flower, enclosing dwarf gay nasturtiums, or crimson roses, cannot fail to delight. *Marandya Bar-*



RUSTIC VASE for plants and  
bulbs, 10/6 and 12/6.



RUSTIC WOOD TILE JARDINER, hexa-  
gon, 11 in. diameter, 45/; octagon,  
16 in. diameter, 55/. Suitable for  
growing bulbs or plants.



RUSTIC WOOD BASKETS,  
square and oval, for plants  
and bulbs, 12/5, 15/; 21/,  
and upwards.

*The above designs are Messrs. Barr and Sugden's of London.*



*clayana* makes a very pretty edging, and comes up constantly self-sown. When once established, so does *convolvulus major*. Many other equally beautiful flowers can be selected according to individual taste. In some stations large vases of stone colored pottery can be procured, Lucknow for instance. When these are not obtainable, the common red pottery may be painted stone color. These should be placed upon a pedestal, from two to four feet from the ground.

Very beautiful vases of terra-cotta can be obtained from London Florists at a cost of twenty-five shillings each, and baskets of galvanised iron may be had, but these require a lining of zinc or pottery, as well as painting. These vases or baskets should be filled with brilliant flowers, as scarlet geraniums, blue lobelias, and, when procurable, fuchsias drooping round the edge while an arum or calladium rises from the centre. White ivy geraniums, or passion flowers are pretty to hang over the basket; achimenes and gloxinias are very effective. If a large vase of flowers is to be placed on the lawn, the following plan is very ornamental.

A circle of earth, thoroughly well beaten together, raised a foot high, and upon this a second circle, a foot from the edge of the first, also a foot high, covered at the top and sides with fine grass. Place the vase or basket in the centre of the upper circle, leaving a green margin of a foot or more round the base of the pedestal or bottom of the basket. The grass will require frequently watering, and a pinch of ammonia placed in the watering can is an excellent preservative. A pair of garden shears, or even large scissors, can be used to keep the grass in order, which should not be cut too close as it is apt to burn.

8. *Rockeries and Ferneries*.—They are best constructed in some shady corner, partially enclosed with trees. If a natural hollow is available, it will be more picturesque than a flat, unbroken surface, and blocks of stone may be introduced at the sides, partly buried in the soil, to form nooks

and grannies for the ferns and plants. Or a bark of earth resting upon a foundation of bricks and rubbish, and faced with stone or boulders of different shapes and sizes, but not varying much in color, with some good soil placed in the spots where the plants will be, will have a good effect—monotony and triviality must be avoided. This bank should in some places be higher than others, and a few large blocks of stone will add to the general effect. The earth should be a good sandy loam, and between the stones sufficient earth must be left to retain nutriment requisite for the plants. In the moister and shadier nooks, ferns will flourish, and on the more exposed parts, mesembryanthemum, portulacae, &c., &c., will thrive with their gem-like flowers, forming a bright contrast to the refreshing green of the ferns. Many alpine and low spreading plants will grow here.

The various ornamental grasses may be successfully used. If water is introduced, it will add much to the beauty of the whole. This may be managed by means of a cask of water placed on an unseen elevation, at a little distance from which pipes are conveyed under ground, with shorter pipes leading among the rocks, in the wished for direction, forming jets or cascades of water, falling gracefully among the rocks and flowers:

9. *Fountains*.—A very ornamental fountain may be made, at a reasonable cost, that will play to a height of sixteen feet, or six, according to the force used, as long, and as often as may be required, the only labor requisite, after the water has once been provided, is that of a coolie. Make a basin of solid masonry, of a tasteful design, sunk one foot in the centre below the surface of the ground, and raised at the sides one foot above the ground, with a graceful slope from the inner rim of the basin to its centre. The diameter of the basin should be made to suit the height of the water jets, the higher they are, the larger will be the basin. Ten feet is a very useful size. In the centre of the basin is placed the jet-pipe which

should be at least ten feet high. This can be concealed in some pretty design, of painted green and decorated with leaves of the date palm. The pipe should be made to screw and unscrew at pleasure from the supply-pipe. When this is removed, the ends of both pipes should be well corked. To vary the device of the fountain when playing, several feather-cut roses should be at hand: they also should be made to screw and fit the mouth of the jet-pipe. Connected with the last-named pipe is another, called the supply, made of iron, with a diameter of not less than three quarters of an inch. This tubing is made in certain lengths to screw together, and can be obtained from the Roorkee Workshop, or any large iron-monger in Calcutta. Care should be observed when laying down this pipe in the masonry that it is hidden from sight: it should be four inches below the bottom of the basin. The length of this pipe will vary according to circumstances. When this has been determined, it will be fastened to a small hand garden force-pump by means of a piece of India-rubber tubing, and carefully secured by covering the join with copper wire.

Three half tubs or casks should be procured, the centre or feed-tub should be sunk level with the ground. Into this the suction pipe of the force-pump is introduced, the other tubs are only sunk in the ground half their depth, and are connected with the feed-tube by means of hollow bamboo piping.

A waste-pipe should be skilfully hidden in the masonry of the basin, having its orifice on a level with the side, and sunk two inches below the surface of the earth in a line taken by the supply pipe, to carry off the surplus water; this pipe should be of a sufficient length to reach the feed-tub, thus waste of water is prevented, as the same is constantly used over and over again, the whole time the fountain is made to play.

The working of the force-pump should never be seen, a prettily devised screen of evergreens should conceal it, if a natural one does not exist.

\* A very pretty effect may be produced by edging the sides of the basin with dark stones, and thickly studded with ferns and moisture-loving plants, as the trumpet lily, lobelia, and mimuli. A force-pump for this purpose costs about ninety rupees.

10. *Arches*.—Arches forming an entrance to a garden or placed across its walks, are very ornamental, covered with climbing roses; gloire-de-dijon, climbing devoniensis, Marechal Niel, and souvenir-de-Malmaison being well adapted for the purpose. There are many dark climbing roses, and the cluster roses are very pretty, but the four first-named are splendid and very quickly growing. Bugainvillea is a magnificent plant for training over an arch. Honey suckle and jasmine are both sweet and beautiful.

11. *Arbors*.—Arbors and rustic seats may be appropriately placed near the fernery, should the garden contain one, and a graceful shade is formed by a weeping willow drooping over them. Another good situation is on one side of the lawn which they face. For forming the floor of an arbor, kunkur well beaten down is good, or if not procurable, small native-made bricks, laid edgewise, but the best of all is flagstone. The pillars or supports for the roof, if of wood, should be fixed in concrete or footed with galvanized iron, or copper; the side should either be of trellis work painted, or strong wire netting, and climbers, of a perennial nature, trained closely over. The roof may either be of boards or thatch. This is a matter of taste and convenience. The Turkish tent in its various forms is a pleasing design. Three of the spaces between the supports should be left for an entrance, and round the pillars creepers should be planted.

12. *Pillars*.—Pillars of climbing or weeping roses are objects of admiration upon the lawn. Poles for these, if of wood, should be protected from white-ants either by being inserted in a bed of masonry, or by being burnetized in the same manner as railway sleepers. A strong pointed iron rod is

best, if procurable, or a masonry pillar may be used. The height should not exceed twelve feet, around which space must be left clear of turf, and very rich soil introduced, for pillar roses require good earth and much manure, a second supply being given after flowering, two or three inches of old soil being removed to make room for this. When pruning a pillar rose, begin at the base, and thin out the shoots, until the top is reached. If the full height is not attained, select one or two strong shoots and tie to the pillar. Cut all laterals to three eyes, but if insufficiently covered in any place, cut one back to one eye, to produce a vigorous shoot to supply the vacancy. *Gloire-de-dijon*, *Marechal Niel*, *Gloire-de-Rosamene*, *Laure Davoust* are fine and well suited. The moonplant is a handsome plant for a pillar, either alone, or with that beautiful *ipomoea rubra cœulea*. *Passion* flowers are all suitable, so is the *bignonia superba*, a splendid king canary colored trumpet flower. The foliage of all climbing plants is much improved in health and appearance by a judicious use of the garden syringe.

Weeping roses must be budded on stocks four feet high, and after the second year the principal shoots must not be shortened until they reach the ground, the lateral shoots only need pruning. Close pruning improves a weak plant, but causes a vigorous one to form wood.

## CHAPTER II.

### *Preliminary Operations.*

1. *Preparing Pots.*—If the pots are new, let them be soaked in a tub of water for some hours and afterwards dried. If they have been previously used, they must be washed so as to be perfectly clean. This is necessary for the health of the plants as well as for neatness and appearance.

Examine every pot to see that the hole for drainage is perfect, and fill each pot about one-third with charcoal, then to within one inch from the top with good light soil, carefully



cleared from all insects, worms, and grubs. Let the soil be gently pressed and smoothed on the top.\* All is then ready for seeds and cuttings.

2. *The Soil.*—The soil should be half or two-thirds of good garden mould, one-third of leaf mould, and some sand, if the soil is too rich.

When about to fill the pots, it is as well to let the earth be warmed by the sun for an hour or two, and let the water used be tepid. Pour some water into the middle of the heap of earth, and with a trowel or *koorpee* work the dry soil in until all is quite moist, but not wet, it is then to be used as previously directed.

To prepare leaf mould, it is best to dig a pit, in an unobserved part of the garden, and throw in all the vegetable refuse, watering occasionally if dry. It should be then stirred and covered with earth. A basket full of lime is a good addition, as it aids decomposition and adds to its richness.\*

3. *Potting.*—In potting a new plant, or re-potting an old one, place a handful of moss, if procurable, on the top of the charcoal or potsherds forming the drainage, then a layer

\* An excellent method of preparing soil for tender annuals and choice plants is thus described in an old work on gardening. Take turf and lay it in a ridge 18 inches wide, at the bottom 3 feet high, and any length desired. If the turf is only two or three inches high, so much the better, dig up earth and all. Take fresh stable manure, which is to be used in making the hot bed, before it has been turned, and lay it equally round and over the turf. If there is plenty of manure in proportion to the turf, the latter may easily be heated to 200 degrees, which will destroy all insects, roots, herbage, &c., and wonderfully enrich the soil by the distillation of gas evolved from the manure during its fermentation. The manure must be turned once or twice while on the ridge to fit it for the hot-bed. When ready make up the bed, and remove the turf to a shed or airy spot to dry, when it is ready to be used. This is the very best soil for annuals, but when put into pots, should be mixed with a little vegetable mould, and some sand. In the season, turf may be prepared by covering with short grass from mowings, though this is inferior. By the former process it is ready in ten days. Only prepare the soil required for one season's sowing and transplanting.

of potsherds broken quite small, and some pieces of rough earth over this, it is then ready for the plant.

When merely shifting a plant from a smaller pot, press a small stick through the hole for drainage at the bottom of the pot, and having spread your left hand over the earth on the top of the pot, letting the stem of the plant pass between your fingers, gently turn the pot over on its side, or if quite small, with the ball of earth into your hand, and remove it entire. It is necessary to keep as much earth about the roots as possible, as the slightest disturbance causes a check.

Place gently in the new pot and keeping the plant steady with one hand, with the other fill with new soil, pressing it firmly in, remembering to let the plant be raised sufficiently for the earth to be about an inch from the top of the pot. When finished it is easier for one person to hold the plant steady, and a second to fill in the earth firmly.

In re-potting old plants, examine the roots, cutting away any thick parts, but avoid injuring the young rootlets, which should be spread out gently with fine soil, carefully placed over and between each layer of rootlets.

When filled to within one inch of the top, shake the pot, and give it a good watering, then prune back the top, in geraniums and fuchsias for instance, to within two or three close forks of the old stem, so that the top bud of each joint should have an outward direction. When thinning, always cut near a joint; when pruning, cut near an eye. Thus all dry ends are avoided.

4. *Seeds.*—In sowing seeds it is said to be a rule to cover them with soil to their own depth, the very minute seeds should be only dusted over. After covering the seeds with earth, it must be carefully pressed and smoothed with a small piece of wood.

The pots of seed must be sunk in a bed of sand, or a slight hot-bed, or in a larger pot with sand or moss between the two

pots, but the best plan of all for a verandah is to put the pots of seed in a box of sand ; placing a square of glass over them, which will keep the earth moist and prevent birds devouring the seeds. In books on English Gardening, we are warned not to water these pots of seed, till the seedlings are potted out ; but in India, even with the glass and watering, the sand they stand in very often becomes too dry. The best plan is to lift the pot and place it in a pan or tub of water, rising to the rim of the pot, but not over it, and leave it until the water oozes through the earth on the top, then take it out, drain a little, and re-place it after the seeds have germinated ; this is a good way of watering them at first ; as it often does not require repeating for two or three days. Afterwards, the safest plan is to hold the spout of the watering pan close to the side of the pot, and gently flood the whole surface. For geranium and other choice, but not very tender seeds, a wine box filled with good soil, and drained with broken pots or charcoal, is the very best thing to grow them in, and if placed in a sheltered place in the garden, where they get only a little morning sun, they will be much finer and hardier than if grown in pots in a verandah. They can remain in the box until they require potting out. Sow gloxinias, cyclamen, begonias, and other seeds that require a warm moist atmosphere in flat pans. Place two stone bottles of hot water or a hot water tin in any empty box, re-filling them with boiling water night and morning. Set the pans over the bottles or tins, and cover the box with glass. In this manner many seeds germinate freely which commonly fail, as the hot water supplies them with a gentle bottom heat, and the warm steamy atmosphere they delight in.

By raising the glass a little morning and evening, the seedlings can be hardened by degrees, and if they require water, lift out the pan and gently flood with tepid water.

When the little seedlings have grown nicely, and gradually become hardened ; by exposing to air and light, they may be

re-potted, either singly or severally, in one pot, according to their variety and size. Nothing is so convenient for putting the tiny plants as an old tea-spoon, taking care to keep as much earth as possible about the roots, and having made some little holes in the new pot of earth with a small stick, lift them one by one, and gently, but firmly, press the soil around them, never filling any pot to the brim with earth. The pots ought to be replaced and shaded for a few days, till they have recovered, when they can be grown on as before, or gradually hardened and removed to their permanent homes.

5. *Cuttings*.—Cuttings of most plants will grow either from woody pieces which strike root without heat, or from young green shoots kept moist and warm. The former method is slower but almost sure to succeed, though these woody cuttings are often outstripped by the quickly growing green shoots. For woody cuttings, take a branch of the plant you wish to propagate and count the number of joints. Although a cutting may be made of each joint, it is better to allow two joints, the lower to plant in the soil to make roots, the upper to produce leaves. Cut with a sharp knife straight through the branch, one inch above and through or below the joint, and be careful not to tear or bruise the cuttings. Leave them in a shady place for an hour or so, and then plant them, having made for each a small hole close to the side of the pot. Put in the cutting and press the earth very firmly to it, filling up carefully. They may be about an inch apart. Cut off the leaves, leaving a bit of stalk until it dries up; or the American mode of growing woody cuttings may be followed, by placing them either in a wide mouthed bottle, with a piece of damp sponge at the bottom, or among a heap of slightly damp moss, drop lightly in and leave for ten or fourteen days in an airy, cool situation, tying a piece of muslin or net over the mouth of the bottle. When a callus, which is a growth at the end of the cutting, is formed, they are ready to plant and put out roots at once. This is

specially successful in vine cuttings. Sink every pot either in the earth, a box, a bed, or sand, or a second pot filled with sand, the inner pot being raised to the level of the outer one. Fresh green shoots of fuchsia, geranium, heliotropes, sweet verberna, and just slit, but not cut, from the stem, proceed thus : Remove some of the lower leaves by cutting a little distance from the stem, so as to leave a little piece of the footstalk ; let the earth in the pots be warmed by the sun, and insert as before, or fill a pot half full of sand. Sink the pot either in sand or earth ; plant the cuttings to reach nearly to the rim, and cover with a square of glass or empty pot. Soft-wooded plants root best in equal parts of silver sand, leaf mould, and powdered charcoal. Hard-wooded plants in sand alone. Air giving must not be forgotten.

Watch carefully for mildew or decaying leaves and remove at once. Shade from sunshine, and give air morning and evening. A shade made of panes of glass in the form of a lantern, or a square of glass laid over the box in which the plants are placed, are both good plans.

Heliotropes, sweet verbenas, pansies, carnations, calceolarias, verbenas; &c., grow well in earthen pans or saucers in which is placed a layer of sand, flooded with a thin sheet of water ; simply stick the cuttings which should be an inch long into the sand, and renew the water as required. If placed in the box heated with hot water and covered with glass as recommended for tender seed, they strike at once, and are very soon rooted and fit for potting out.

For tender seeds and cuttings on a large scale, a hot bed made in the garden with fresh stable manure is most useful. It is made by throwing the manure in a heap, working it well, and watering it if too dry. In three or four days' time, turn, shake, and mix thoroughly, throwing the litters portion in the centre. After repeating this process two or three times, make up the bed fully exposed to the sun, on well drained ground, sheltered from wind, raised from two and-a-half to

six feet high, mixing and treading down well, while making: over this place from three to six inches of sand, or sand and earth. If a frame of wood with a glass sash can be had, it is the proper thing to place over the bed. In a few days the heat will have risen, when, if you have a frame, air the bed and insert a test stick, to try the heat. If too hot, either allow it to cool sufficiently or add more sand and earth. When ready, plunge the pans or pots, containing seeds or cuttings. If you have no frame, place a square of glass over them. In hot sunshine, a shade is necessary, a thatch raised two feet over the bed, protects from sun and rain.

All cuttings strike readily in the hills, during the rains, in the open air, either in beds, or which is more convenient at that season, in boxes, or common flat baskets filled with black earth, placed in the verandah. They seldom require watering, and thrive with but little care bestowed upon them.

Roses in the plains strike best on the side of the water-course leading from a well, under the shade of a tree or bush. July, November, and December are the best months and they seldom fail, and have been known to bloom within four months. Rose cuttings for the sake of an experiment may be grown in a bottle of water, with a pinch of charcoal in it to prevent it becoming turbid, filling up the bottle as the water evaporates. A tart fruit bottle is the best for this purpose. When a thickening forms at the bottom of the cutting or slip, and thread-like rootlets are perceptible, they may be planted out in pots, filled with sandy soil, placing pure sand round the slips. Cuttings of roses may be, from nine inches to twelve, taken off close to the old wood, with a heel.

6. *Layers*.—To layer, loosen the soil about the plant. Strip off a few leaves from the shoot at or from six inches to two feet from the point of the shoot. Take the shoot in your left hand and insert a sharp knife behind an eye, on the upper side of the shoot; then pass the knife carefully upwards, cutting half through the shoot in a slanting direction an inch

or an inch and-a-half. Bend down the upper part of the branch into a hole, previously made, and peg it down in it. It must then be covered to a depth of two or three inches with soil. Another method is to raise a pot to the level of the branch you intend to layer, then bend down the branch, split the tongue at the end, and insert a stone. When this is done, place it in the pot. Tie each layer to a small and firm stick, to secure its position. June, July, or August are good months for this operation. In November remove the layers, by cutting off a few inches from the tongue. June, July, and August will suit many hard-wooded plants, and November and December for soft-wooded.

The Chinese method of layering is to select a strong shoot of a year's growth, tongue it as above described, inserting a stone to keep the slit open. Bind a ball of green moss round the tongue, and keep the moss constantly wet. This can be done by suspending a large bottle gourd, or an earthen vessel perforated with a small hole, in which a piece of rag has been loosely inserted over the branch. At the end of six weeks, rootlets will have formed, and the plant can be separated and planted. As there may be difficulty in procuring the moss in many parts of India, a ball of well-tempered clay answers equally well. It should be bound on firmly with tow or simial material. Many gardeners remove a ring of bark about an inch in width just below a leaf bud, taking care that no portion of bark remains, and they apply the clay, afterwards keeping it moist by a vessel of water suspended over it as before directed. Pass a piece of string through the hole in the pot of water and connect it with the branch, so that the water slowly trickles down to the ball of clay.

7. *Propagation by Offsets.*—These may be taken from the parent plant and when they have made roots, should be potted and treated as seedlings. Care must be taken in dividing them, that the stem or root of the old plant is not injured. Some plants are propagated by division of roots. This is done

by cutting the root into short pieces, retaining as many fibres as possible. Put each into a small pot, leaving only the top visible, then proceed as with tender cuttings.

- Most bulbs and tubers are increased by division of root, or removing of offsets and young bulbs. The cyclamen, however, is only propagated from seed.

8. *Budding*.—This is best performed about January, when the green wood parts freely from the bark. It may also be tried in July, but the first-named month is the favorite one with gardeners for this operation. Make an incision in any spare shoot, and with your budding knife, or an ivory mesh, raise the bark, and see if it leaves the wood readily, if so, select the buds you wish to insert from young shoots which have all but perfected their growth, and when the buds on the lower part of the shoots are firm and set, with a sharp knife, take a small slice of the bark from the selected shoot, inserting the knife half an inch below a leaf and bring it out half an inch above. This is called a shield. Pick out the piece of wood found in the shield, leaving only the bark and the bud with the leaf. Never expose the prepared buds to the sun. Either put them in water at once, or in a pan with damp moss. Some remove the bud leaf, but it is a protection to the bud. The Indian method is to cut off the top of the leaf. Having fixed on the spot where the bud is to be inserted in the stock or tree, make a perpendicular clean cut, an inch and-a-half long, and raise the bark on either side with the budding knife, then bend the shoot down, and slip in the bud under the bark. Bind round with a piece of bast, matting, or darning cotton, both above and below the bud, but not on it. The transverse cut often made is unnecessary and likely to break, and is often the cause of so many buds falling from the stocks in a high wind, especially with large standards. If the weather is very hot and dry, some damp moss or cotton may be tied on loosely. All the branches of the stock, except the one budded on, must be entirely cut



away; even this may be slightly shortened. Secure the growing buds with hemp or matting to a stake rising two feet above it, to prevent its being forced clean out of the stock by sudden gusts of wind or violent storms. In three weeks the bud will have established itself, or taken, when the binding may be removed, and again tied more loosely for a month longer, then entirely removed and the budded branch shortened to one joint above the bud, not allowing any portion of the stock to grow. When the bud has grown three or four inches, it may have the top pinched off to make it branch out at the side. At the pruning season remove the weak shoots, and shorten the strong ones to the form you wish.

9. *Pruning*.—As a general rule the proper time for pruning a plant is when it has finished flowering. This causes it to start with fresh vigor, besides improving the form of the plant and increasing its flowering tendencies. Hard-wooded plants require little or no preparation, and may be reduced at once. Soft-wooded plants on the contrary require hardening before being cut back, and should first be exposed to the sun, with just enough water to keep them from flagging. If in pots it is as well to sink them in earth or shade them, so that the roots are not burnt. In the plains, a spot where they can stand out of doors day and night, getting the morning sun only, will mature the wood, and the roots will not suffer. Many close-headed plants only need a few of the stronger shoots to be slightly shortened so as to preserve the form.

### CHAPTER III.

#### *General Directions for the after-treatment of Cuttings, Seedlings, &c., &c.*

*Cuttings*.—When cuttings are fairly struck in pots or boxes, and have made some growth, they may be potted separately in the pots in which they are to flower. Turn the earth out in a lump or ball, and divide the cuttings carefully, keeping

as much earth as you can around each rootlet and pot in the manner directed for "potting plants." If the cuttings are in a box, raise each carefully with the trowel, at the same time keeping the soil pressed round it, and transfer gently to the pot, remembering to have previously placed the same in the sun to warm the earth. Be sure that the soil in the pot or box is moist, or it will break away in removing the cuttings.

2. *Seedlings*.—These in many cases are intended to remain where sown, and generally require thinning out to prevent over-crowding. The plants removed can be placed in another pot or bed. When required to be planted out or to remain as single specimens, they can, when first taken from the seed pan, be placed three or four in one pot, or a larger number if placed in a box, to be again removed later. Special plants require special treatment, lobelia and forget-me-not, for instance, must have a saucer of water under the pot; mau-randia and other creepers, if to be trained in pots, should have one strong seedling in each, and a small trellis of bamboo, of an ornamental character, as a support.

3. *Watering*.—In the cold season it is better to give water about 8 or 10 in the morning, after it has been warmed either by exposure to the sun, or by the addition of hot water. Well water, drawn fresh, is suitable. Water when the sun is not actually shining upon the plants. Often every drop of water given in hot sunshine will burn the leaves.

Cuttings and transplanted seedlings ought not to be watered over the leaves. Give sufficient to make all the leaves moist, and be careful not to wash away the soil from the young plants. With tender plants as before named, standing the pot in a pan of water if very dry, or gently flooding them, is the safest. Should the soil be dry by the evening, give water, but more sparingly, and only, if necessary, when the sun is off the plants. In the warmer weather, watering twice a day is generally necessary. If a plant is seen to be

flogging from the heat, it may be placed in the shade and water given to it. If a verandah plant, water the floor to create a moister atmosphere. Many gardeners advise a gentle syringing to be given to tender plants.

4. Air and light are most necessary for the health of plants, and many seedlings grow tall and weak from an insufficiency of both. The pots containing plants should every day or two be turned, otherwise the plants will be drawn to one side. They also require lifting on account of insects collecting under the pots. If white-ants abound, a sprinkling of wood-ashes under the pots is advisable. All wooden boxes must be raised on bricks or stones. Pots also can be raised in like manner.

5. *Damping Off*.—Seedlings are apt to damp off if left too long in the seed pan and crowded. If there is a convenient distance between them, stir the soil with a pointed stick, so as to prevent the formation of moss. Dusting the surface of the pot or box with finely powdered charcoal has a beneficial effect in destroying this, as well as fungi. Young plants should not be subject to this treatment. Re-potting may be resorted to, and obviate the necessity of using charcoal. Never permit the earth to become hard or caked. Frequent surface waterings will consolidate and crust the earth; it will be necessary, in consequence, to soak the pots occasionally, as the particles of earth are raised by the water rising through them, whereas by continuing the surface-watering, the soil becomes hardened with every watering, and prevents to a serious extent the admission of air to the roots.

*Transplanting*.—It is well to bear in mind, that there is in every plant a part called the *collar*, from which the stem and leaves shoot upwards and roots downwards. Some plants, if encouraged by earthing up or transplanting, throw out roots above the collar such as balsams, cockscombs, &c. These plants are improved by transplanting, as every additional root gives more nourishment. Other plants which do not

throw out roots above the collar are on the contrary checked by transplanting, and these should be sown as thin as possible, where they are to remain, or transplanted with a large ball of earth attached. In transplanting stocks, it is well to do it *between* the second and third pair of leaves being produced, keeping the earth well round the roots. Some take off the extreme end of the top root to induce more fibres to form. Large plants must be lifted carefully with large balls of earth unbroken. In transplanting seedlings that will bear this treatment, keep the soil well about them. Should any fibrils be bruised or injured, cut them off above the hurt. After putting in the seedling, crumble fine soil round it and press down with the hands to give the root firm hold of the soil at the lower extremity. If only made firm at the collar, it will probably not thrive. Nasturtiums have all very small roots and are easily killed by transplanting, unless care is taken.

6. Washing leaves of advanced plants is an excellent mode of improving their beauty and health. Fuchsias, geraniums, camellias, cyclamen, &c., &c., amply repay for the trouble bestowed upon them by their fresh healthy appearance. Tepid water, a small piece of sponge, and a little soap are required. Each leaf must be thoroughly cleansed on both sides. When this is done, wash with fresh clean water. Care is required that the leaves may not be bruised or broken off in the process.

7. *Protecting Rootlets.*—Young plants are very susceptible to injury by the sun striking on the pots. Some protection during the heat of the day is desirable unless the pots are plunged into second pots or boxes, or they can be for a few hours put in the shade, to be again restored to the full light as soon as the power of the sun declines, excepting in frosty nights. All plants in pots are greatly benefitted by being placed in the open air. Put them out about sunset and return them in the morning to the verandah.

8. *Liquid Manure.*—When established plants are likely to come into flower, nothing gives them such a start as a water.

ing of liquid manure once a week. It must be given weak and clear. It is made by a spadeful of manure taken from a goat or sheep-fold or from the bullock shed, adding three parts of water. It should be allowed to stand and ferment, which is sooner or later, according to the season of the year. When the fermentation subsides and the mixture is clear, it is then fit for use. If the color is very dark, dilute it with water at the time of using it.

A weak solution of potass, with a little ammonia, is very beneficial to pot plants.

All watering must be given with great judgment. In the cold season a plant requires watering less frequently, unless the flower buds are swelling. All plants in flower must have a plentiful supply. If a plant is already moist enough, do not give more water because it is the stated hour for watering. Should you, however, see a plant flagging for want of water on a hot day, give it an extra supply out of the sunshine, before the regular hour.

9. *Cleanliness.*—No amount of care will make plants pleasant to the eye unless this is stringently carried out. Every yellow leaf, every faded flower, should be at once removed, those reserved for seed excepted. All caterpillars, green fly, and other destructive agents must be diligently searched for and the plants carefully cleared from them, all dust washed from the leaves, the pots themselves kept clean, and when empty, thoroughly washed and set aside for future use.

#### CHAPTER IV.

##### *Annuals and their Treatment.*

1. *Seed whence procured.*—Annuals are grown from indigenous, acclimatized, or imported seed. The latter is chiefly procured from England, France, and America, and is usually the more successful, although climbers grow equally well from seed saved in Indian gardens: for instance, some of the ipomæa raised from acclimatized seed supplied by the Calcutta Agri-

cultural and Horticultural Society far surpass any grown from imported seed, 1. *Rubra Cerulea* being especially large and beautiful.

2. *Season for importing Seed.*—In the hills, seeds should arrive in March or early in April, but in the plains, it is a mistake to receive them in those months, as the excessive and continued damp in the rains destroys the germinating power, and the seeds prove worthless. The best time for them to reach their destination is September, and north of Lahore, in August.

3. *Packing.*—Packets of seeds should be despatched either in air-tight cases, oil silk, or other damp-proof material. A few choice seeds may be sent out in a letter, and they generally grow well. Neither bulbs nor tubers should be packed with seeds on any account, or the latter will be probably spoiled from the moisture contained in the bulbs. On arrival they should be kept perfectly dry, in well stoppered bottles, or a tin case may be used for this purpose. Some advise a sprinkling of quick-lime with the seeds. Packages of seeds can be sent by temple-post, securely closed, agreeably to postal regulations.

4. *Quality of Seed.*—One important point is for the seed to be perfectly fresh and sound when packed, and this can only be secured by giving an order to a trustworthy seedsman; as unprincipled dealers frequently mix old seeds with fresh, thereby causing disappointment, as very few germinate. The several Horticultural Societies in the country import, as a rule, seeds that can be depended upon.

5. *Time for Sowing.*—In the plains seeds for flowering in the cold weather are usually sown about the middle of October. Some require to be sown earlier, as *canariensis*, *tropaeolums*, *calceolaria*, *nemophila*, larkspur; again others will not vegetate until the cold weather sets in. In the hills the season for sowing seeds is nearly identical with that of England. Hardy annuals may be sown in March and April,

those of a more tender class in May. All seeds there germinate freely in the rains, and at that season, young plants make astonishing progress. Geraniums, calceolaria, gloxinias, and many other choice flowers may with advantage be raised in April and May, in a box heated with hot water, as recommended in para. 4. Chapter II., then gradually hardened and exposed, and transferred to pots or boxes. When they have their third leaf, they are then ready to derive the full benefit of the rainy season. Gloxinias may remain in the box until the rains set in.

3. *Where to Sow.*—Most annuals may be sown in pans as before directed, or either in a seed bed of good light soil, or in a permanent bed or border where they are to remain. By the two latter methods the seedlings are stronger and not liable to damp off. The beds must first be flooded, and when the earth is dry enough to crumble in the hand, it should be finely broken, and the seeds sown. The tiny plants must be pricked out when large enough, and require shading for a few days afterwards, during the heat of the day, being uncovered at sunset. It is important with transplanted seedlings not to let any water touch the leaves until they have quite recovered their removal, and the foliage has become crisp. Stocks, balsams, and asters require frequent shiftings. In a geometrical flower garden, each bed or division filled with a distinct or contrasting color has a very pretty effect. If sown in a bed, the seedlings will require thinning out and regulating, so as to be gradually distributed over the whole surface. Virginia stock and mignonettes are best sown where they are to remain.

*List of Seeds.*

Amaranthus.	Lobelia, various.
* Antirrhinum (Snapdragon.)	Lupinus.
Aster.	Mesembryanthemum.
Balsam.	— Crystallinum (Ice plant.)
Bartonia Aurea.	* Mignonette.
* Bellis Perennis (Daisy.)	Mimulus.
Brachycome Iberidifolia.	Myosotis (Forget-me-not.)
— Alba.	Nemophila.
Browallia Cerviakowski.	* Nierembergia Gracilis.
— Elata Alba.	Oxalis.
Calandrinia.	Pansy.
Calceolaria.	Papaver, (poppy) various.
Calliopsis bicolor.	* Penstemon.
Candytuft.	* Petunia.
Campanula, various.	* Pelargonium.
* Canna.	Phlox Drummondii.
Carnation.	* Picotee.
Celosia Pyramidalis.	Portulaca.
— Cristata (Cockscomb.)	— Grandiflora.
Centaurea.	Salvia.
Chrysanthemum.	Saponaria Calabrica.
Clarkia.	Sedum Argureum.
Cuphea.	Spraguea umbellata.
Datura, various.	Stock.
Delphinium (Larkspur.)	Sweet William.
Dianthus, (various pinks.)	* Verbena.
Digitalis (Foxglove.)	Veronica Glauca.
Escholtzia Californica.	— Syriaca.
Hollyhock.	* Wallflower.
Linum.	Whitlavia.

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\* Perennials but flower the first year from seed.



*List of Climbers.*

Bryonopsis laciniola.	* Lapageria rosea.
— Erythrocarpa.	Loasa aurantiaca.
Calampelis scabra.	— Herbertii.
Clanthus Dampieri.	* Lophospermum.
* Clitoria, various.	Maurandya Barclayana.
Cobaea scandens.	Nasturtium.
Convolvulus.	* Passiflora.
Hardenbergia.	Sweet Peas.
Ipomœa, various.	Thunbergia, various
Lagenaria (Bottle-gourds.)	Tropæolum, various

*Everlasting Flowers.*

Acroclinium.	Rhodanthe.
Gomphrena.	Waitzia.
Helichrysum.	Xeranthemum.
Helipterum.	

*Bulbs, Tubers, Corms, &c.*

1. *Bulbs*.—These are among the choicest of our floral treasures. Many kinds can be grown with success in India, though some of our lovely spring bulbs, as the tulip, crocus, and snowdrop, are nearly hopeless, excepting in the hills or the Punjab, though crocus have flowered in a very dry station in Central India with a cold season of two months and-a-half. They were grown in a verandah. Had they been planted in a garden border, not too much exposed to sun, or even if the boxes containing them had been put out at sunset, and taken in early in the morning, it is probable that they might have flowered more freely. The violet and white were the best. In ordering bulbs, tubers, &c., from England, it is important for them to be despatched as soon as their season of rest has set in, so that they may be kept out of the ground as short a time as possible and have the full advantage of the cold.

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\* Perennials but flower the first year from seed.

season. Some kinds are best raised from seed sown in this country, and appear better suited to the climate; cyclamen and gloxinias are instances.

All bulbs require a time of rest after flowering. Some can be kept out of the ground from the decay of the flowers and foliage until the time of re-potting the following season. Lilies and other laminated bulbs must not be more than eight weeks out of the earth, but six is better. Should any bulbs have been left so long in the ground that they have thrown out fresh roots, they must be taken up with balls of earth attached, but this ought not to occur if the proper season for drying has been observed. Very many bulbous plants will succeed in India, if they are dried off at the commencement of the hot weather, and re-potted in the beginning of the cold season; and it is most important for them to be dried entirely in the shade and quite gradually. A drawer or shallow box, having a trellis work frame on the top, is very convenient for storing bulbs, each resting on one of the open squares of the trellis. The name or number can be attached to prevent mistakes. Care must be taken to protect them from animals and insects. No bulb must be suffered to touch another. Hyacinth bulbs must be stored with the summit downwards. Special directions for the culture for a few of the choicer kinds of bulbs are annexed:

2. *Achimenes*.—These may be kept dry, in blotting paper or sand, until they start growth about March, when they should be re-potted nearly an inch deep. They look lovely in a hanging basket, in which the pot or pan in which they are grown must be inserted. Leaf mould, silver sand, and coconut fibre make a good soil for them; the drainage must be perfect and occupy half the pot, which need not be deep. In the hills they are best started in April, in a frame or a box, heated with hot water: they will then flower in August. At the beginning of the rains, remove them without disturbing the earth round the tubers and place them in good soil in an

ordinary box in the verandah. They ought not to be exposed to very heavy rain or a hot sun. In November they will be ready to dry off by ceasing to water: they require to be taken up carefully, as they are brittle.

3. *Agapanthus Umbellatus*.—The blue African lily, a grand noble plant, with large umbels of flowers.

*A. U. Alba*—Is a pretty white variety.

*A. U. Variegatus*—Has beautiful variegated leaves, and is grown as a foliage plant. They require the shelter of a verandah, and an abundance of water during the growing season. As these plants are green nearly all the year, they are very ornamental placed in a large tub, and send up beautiful heads of flowers in the rains. Plant in a strong rich loam.

4. *Alströmeria*.—Exceedingly beautiful plants, bearing large gladiolus-shaped flowers. When once planted, they should be left undisturbed. A well drained sandy soil is necessary, and cover essential. There are some beautiful varieties: yellow, crimson, and mixed colors.

5. *Amaryllis*.—These are justly considered as plants of rare beauty. Many of them thrive well in India, particularly the hybrids. In the plains they are best grown in beds, composed of a highly decomposed and friable turfy loam, one-fourth leaf mould, with a little sand. They may also be grown in large pots. After the flowers fade, a growth of leaves should be encouraged, and these allowed gradually to dry, as the bulb requires a rest of two months. Many of these flower in February and March.

6. *A. Sprekelia formosissima*—Jacobæa lily.—A rich crimson flowering variety, producing its flowers before and in the rains.

7. *A. Atamasco* or *Zephyranthes*.—The flower of the west wind, very similar to a white crocus. *Z. carinata* and *rosea* are pink varieties. *Z. sulphurea* is a pale yellow kind. All varieties have crocus-like leaves and flower during the rains. When planted in lines, they form pretty borders.

The *Haëranthus* is a species of the above, bearing flowers in clusters, chiefly of crimson or scarlet. They flower in the rains and the stem must be allowed to die down.

8. *Anemone*.—These plants may be grown in most stations, but they degenerate to such an extent as to be almost worthless for a second season; it is best therefore to import fresh tubers each year. Plants may be raised from seed, and the seedlings will flower the second year; the tubers must be taken up at the beginning of the hot season, and kept dry until October, when they must be re-potted about two inches below the surface.

About a month after flowering, if properly exposed to sunshine, the roots will be matured. When the leaves begin to decay, take them up, and cut off the dead stem close to the crown and spread out the tubers in an airy shady place to dry gradually. They must be frequently turned. Clear very gently from them, when half-dry, any portion of soil adhering. When perfectly dry, place them in paper bags or boxes previously warmed.

9. *Arum Calla* or *Ricardia Elthiopeca*—The Trumpet Lily.—This is a most charming plant and easy to manage. One rhizome, placed in a large flower pot previously prepared with a charcoal drainage and filled with rich soil and allowed to stand in a shallow dish kept full of water, will flourish luxuriantly, or three or four may be placed in a half cask. The large broad leaves, and the scroll-like white blossom, look peculiarly graceful. It increases so quickly that from three roots, if allowed to remain undisturbed and freely supplied with water, as many as twelve or fourteen plants will be obtained, and be fit to plant out the following season. This plant thrives best under cover, where it will not be exposed to a hot sun. A few hours' exposure will wither the flower, and burn the leaves. They usually send up four or five flowers in succession in the plains in February and March; and in the hills, in the rains.

When the flowering is over, and the leaves turn yellow at the edges, gradually lessen the supply of water until the whole of the leaves are dry and yellow, when it should be allowed to rest until leaves begin to appear in October.

The best plan is to leave the plants in the pots or tubs until the time of re-potting in October, when they may be divided, and the smaller roots planted three or four inches apart, in a box, to grow for another season's flowering. Large roots should be planted two inches under the soil. These directions apply equally to the hills or the plains, with the exception that re-potting should take place in March or April, or they may be placed in the open garden and there left undisturbed. It is necessary to be careful not to break the leaves, as the plant suffers from the loss of a single leaf. Arums can be raised from seed and made to bloom the second year. When planted in tubs, a little powdered charcoal, mixed with sand, will prevent moss from forming on the surface of the soil. These plants are obtainable from several public gardens and can be sent by post. They are better thus obtained than imported.

*A. Albo-Maculatum*.—Very ornamental, with white spotted leaves.

*A. Crinitum*.—A variety, with flesh-colored spotted flowers, long, and covered with hairs, with singularly cut curious leaves and marbled stems.

*A. Pictum*.—A decorative plant, with beautiful foliage, the centre of the leaves being rose colored, shading gradually into the dark green edge of the leaf. It requires a shady situation and an abundance of water.

110. *Begonia*.—Superb plants, some remarkable for the beauty of their foliage, others for their flowers. They require a very perfect drainage of charcoal, and for soil, a mixture of cocoanut fibre, sand, and leaf mould. It is a good plan to insert the pot in a larger one, raising the rim of the

inner to a level with the outer, by means of drainage, and then placing sand between the two. A few of the bulbous-rooted varieties are *B. Boliviensis*, with splendid vermillion flowers and fine foliage, having the elegant habit of the *Fuchsioides*.

*B. Carminata*.—Salmon colored flowers, tinged with rose.

*B. Discolor*.—A kind with crimson veined leaves.

*B. Gravelotte*.—The leaves of this variety are a coppery brown with pale green veins, and are from four inches long. The flowers are a brilliant carmine, very large. This is a fine new variety. All begonias require care in watering, which must be exactly proportioned to their wants or they will flag, too much or too little being equally bad for them. They require shelter both from very hot sun and heavy rain. They can be raised from seed or cuttings, and with a single leaf will frequently grow. Those grown from tubers are perhaps the strongest.

11. *Caladiums*.—Strikingly beautiful foliage plants, the leaves being shaded or spotted with white, red, or green. Whether grown as single specimens for a lawn, as a collection with rock work, in the flower border, or in pots, they are most effective and ornamental. They are easily managed, being stored in dry sand in their season of rest, and re-potted when they shew signs of growth. They are easily propagated by cutting the roots in sets, like potatoes, giving an eye to each. The variety is endless, but the following may be named as choice kinds:

*C. Bataviense*, *C. Esculentum*.—Both growing in the public gardens of Europe to an enormous extent; the leaves exceeding four feet in length.

*Alcide Michaux*.—Dark green leaves, crimson centre, with white spots on a green ground.

*Auguste Riviere*.—Red centre, crimson spots, with white rays on a light green ground.

*Beethoven*.—White leaves veined and marked with green, and rose-colored centre.

*Chantia*.—Large leaves, thickly spotted with crimson, and a crimson midrib.

*Pictum*.—Green leaves, blotched with white.

Caladiums can easily be imported. They travel well packed in a small parcel or a box, carefully wrapped in paper.

12. *Canna*.—A variety of fine foliage plants much used in England in sub-tropical gardening, nearly all of which are met with in India. They look best grown as single specimens, or mixed with other plants in a border. Roots of the best kinds should be imported. *Canna* also grows readily from seed.

*C. Indica* or Indian Shot—Has small bright scarlet flowers. There is also a yellow kind. Those chiefly grown are—

*C. Annæi*.

*C. Gigantea*.

*C. Warszewiczii*.—Stems and leaves more or less brown, crimson flowers.

*C. Zebrina*.

*C. Flaccida*.—Is very different from the other varieties, having bright yellow flag-like flowers.

13. *Crim.*.—A large variety, are indigenous to India, and imported kinds succeed perfectly well.

*C. Superbum*.

*C. Augustum*.—These bear large umbels of twenty or thirty fragrant rose-colored flowers.

*C. Gigantum*.—Bears large clusters of sweet-scented white flowers.

There are many other varieties, but those named are perhaps the choicest.

14. *Cyclamen*.—Although stated in several books on Indian Gardening that it is useless to attempt the culture of the cyclamen in the plains, this is quite erroneous, as plants have been raised from seed and made to flower with success. A heated fern case, or a box placed in a verandah, containing a bottle or tin of hot water, placed under the pan of

earth in which the seed has been sown, will start them at once. The hot water will not be necessary if the seed is sown before October, but a square of glass in either case should be placed over the top of the box. They should be grown on until April, separating, if the plants are too crowded, and placing the pots in a sheltered spot in the garden. In April pot the little corms half an inch below the surface of the soil, three or four in a pot, placing the pots in a sheltered verandah. They will flower in the cold weather and by their beauty well repay the trouble bestowed upon them.

Full-sized corms, whether raised from seed by the grower, or imported from England, must be planted with half the corm above the soil. Washing the leaves of large plants with a small sponge and tepid water, refreshes and improves the plants. Seed obtained from Wiggins, Prize Strain of *C. Persicum grandiflorum*, will give an abundance of plants. There are various other kinds. They all require good drainage, charcoal being best for this purpose. Give plenty of water, and do not expose them to a very hot sun. The corms are best left in their pots with very little, if any, water during their time of rest. The following plants are very pretty :

*C. Atkinsi*.—White, with a crimson centre.

*Ditto ditto*.—Roseum.

*C. Persicum Odoratum*.—Sweet scented and ornamental.

*C. P. Rubrum Odoratum*.—Rose, with a scarlet centre.

*C. P. Tricolor*.

15. *Dahlia*.—This showy plant now grows wild in some parts of the Himalayas, and is generally single or nearly so in its uncultivated state. It is met with in many gardens, in great variety, and with care can be grown to perfection. It blooms freely during the rains. In the plains it must be made to bloom at a different season, December being the best month, as the earlier flowers are apt to be less double. The tubers start growths about July, and at first should only have a light covering of earth put over them and be kept



moist. When they have made shoots from one to two inches long, each eye may be cut from the tuber, as when cutting potatoes into sets, then placed in a pot of sand, and supplied moderately with water. Later, they can be transplanted to pots, tubs, or the flower garden. Each plant requires a stake to support it, and prevent its being broken by the wind. After flowering, the tubers must be ripened by gradually withholding water, the stems being cut down when dry to an inch and-a-half or two inches from the ground. When the tubers are dry, they must be packed away in sand. Dahlias may be raised from seed, which should be sown in September, but the tubers will not flower that season. Cuttings are almost certain to strike in sand under a glass or in the hot bed. Choice tubers may be imported. \* The *Dahlia Imperialis* is a species of great beauty with terminal panicles of flowers of a bell-shape, white with rosy shades. The Bouquet Dahlias are much prized.

16. *Eucharis Amazonica*.—This bulb may be grown in a pot or tub. It has very beautiful fragrant white narcissus-like flowers, with dark leaves. In England, it blooms continuously.

17. *Funkias*.—These have pretty bell-shaped flowers borne in umbels, and are valuable as foliage plants from the beauty of the variegated leaves. They flower about August and are best left undisturbed, unless it should be necessary to separate the roots.

18. *Gesnera*.—Very lovely plants, easily propagated, and in the same manner as achimenes and gloxinias they should be started in a box covered with glass. The rich velvety colored leaves and brilliant flowers cannot fail to excite admiration.

19. *Gladioli*.—These grow to perfection, and they make a good show in large pots, but are seen to greater advantage in the flower border, where, with a back-ground of trees and shrubs, they form one of the greatest ornaments of the garden. The *Ramosus* is an early flowering variety. The *Gardavensis*

hybrids flower later: many of them are inexpensive, and all are beautiful in the border. Not less than six or more than twelve should be planted in one spot, if a fine group is desired. Trench the ground as deeply as possible, giving manure in the under spit abundantly. Let the soil be light, rich, and open, with plenty of sand mixed with it. Plant the bulbs in October, five or six inches deep, surrounding them with sand. With a ball of earth attached to them, they can be removed when coming into flower, and placed in pots or vases, without sustaining any injury. If the weather be hot and dry, they must be watered and once or twice a week have liquid manure applied. The kinds and colors may be selected from any good florist's catalogue as they embrace above a hundred descriptions. If the flower stalk is cut just before the flower spikes expand, they will keep a long time, and look charming in a jardinette surrounded by moss. The bulbs must be kept dry after flowering, either in pots containing earth, in bags, or drawers.

20. *Gloriosa Superba*.—A lovely climbing plant, flowering in the rains. It is a native of India. The colors vary from canary to crimson, as they expand and mature. They can be kept in a dry state either in the garden or pots.

21. *Gloxinia*.—Exquisite plants with profusion of splendid flowers, and often with fine velvety leaves. Their treatment is the same as achimenes. They require shelter from very hot sun, and not to be watered over the leaves. They flower during the rains. Raised beds of gloxinias and achimenes in some of the public gardens are a striking feature. Both plants can be brought to flower for a second time, if desired, in the month of January. Gloxinias are very easily raised from seed, in a warm moist atmosphere, and their bulbs usually flower the second season.

22. *Hyacinths*.—These favorite flowers may be grown well with a little attention. They can be planted in pots of rich soil with the addition of some sand, or in glass dishes, jardi-

nettes, and with sand alone. If in pots, they must not be less than ten inches deep, and the bulbs must be planted two inches below the soil. Oblong boxes may be used: these must have a depth of six or eight inches. After planting, they must be kept in darkness for a month or six weeks, in a dry room; or the pots may be placed in the open ground, and covered with six inches of ashes or light sandy soil. If grown in sand alone, in dishes or jardinettes, the sand must be only slightly damp at first, the crown of the bulb must be left uncovered, press the sand firmly round the bulb, and then place it under a box or half cask, laying a handful of moss over the top of the dish. Examine them occasionally, as they must not be allowed to get dry. They require a very moderate supply of water until the roots are fully an inch long. This will probably be in about three weeks or a month.

When brought into the light, put sand nearly all over the bulb and keep them in a cool light place. Should the flower stem not rise freely, place over them a cone of rolled paper with a very small opening at the top. If it is preferred to have the plants to flower in the jardinette, they can be removed when the flower stems show, by removing the bulb with a ball of earth attached without breaking it, and then placing it in a pan of water, washing all the soil away most carefully, so as not to break the tender rootlets. Plant at once in the dish or jardinette, either in damp moss, sand, or a mixture of fine chopped cocoanut fibre and charcoal; a covering of moss, if procurable, is a great adornment to the whole. When growing, they require a plentiful supply of water, especially at the time of flowering. The north aspect is the best for them. They are much benefited by being placed out at night in the cold and dew. It has been suggested by a correspondent of the Calcutta Agri.-Horti. Society, to cover the plants during the day with bell glasses or inverted lamp shades well corked. After the appearance of the first green shoots, remove the covering at night for the benefit of dew and

radiation, to accelerate the growth of the flower shoots: if slow, it may be placed in a pan containing a few inches of water. This treatment is equally suited to tulips, narcissi, and jonquils. Hyacinth bulbs should be imported as early as possible and the order ought to be received by the florist early in August, so that they may arrive by the middle of October: they travel well in a strong paper bag packed in the husks of linseed, or wrapped separately in any water-proof material, and may be sent by post. When the leaves begin to wither and turn yellow, about a month after flowering, the bulbs may be taken out of the earth, and the stems and leaves twisted off, being careful not to remove or injure the root fibres. Lay them on soil in a box in a shady place, covering them with about two inches of earth or sand. Leave them to ripen for a month, protecting from the rain and sun, but giving full exposure to air. When finally taken up, select a dry day and expose them for some time, avoiding the sun. Rub off the dry fibres and cut off any spots of decay, and store away as before mentioned in the treatment of bulbs with the crown downwards, and do not permit them to touch each other. Those bulbs that have been grown in sand, cocoa-nut fibre, or moss, must, when the flowers begin to fade, be planted in a shady border, or box, supplying them plentifully with water and treating them afterwards exactly as if they had been grown in earth. Watering them moderately with weak liquid manure, when the flowers begin to appear and during the time they are in blossom, adds to their vigor. The single varieties generally succeed best in this country.

23. *Iris*.—There are many lovely varieties of these flowers rivalling in beauty and effectiveness choice and rare orchids. If planted out in the garden and left undisturbed, they will flower well, though possibly not the first season. Roots procured from the hills thus treated, will be almost certain to flower, even if left unwatered during the hot season. Of course water must not be withheld when they begin to grow.\*

They flower in February and March. The varieties of the English and Spanish iris are the chief kinds grown.

*I. Pavonica*.—White, with three bright blue spots.

*I. Persie*.—Light blue and yellow, sweet scented.

*I. Susiana*.—Blush, tinted brown, netted with dark lines.

The above are all most charming. The two first named are recommended for pot culture. The iris will grow in almost any kind of soil, but succeeds best in sandy loam, with some leaf mould or highly decomposed manure mixed with it. The bulbs should be surrounded with sand, as in planting the hyacinth, and placed two inches below the soil. When the roots require shifting, the proper season is after the seeds are ripe.

24. *Ixia*.—These beautiful Cape bulbs require a sandy loam and grow well in pots, where they always attract attention by their beauty and elegance. Five or six bulbs should be planted together in a pot, treating them at first like hyacinths, water being sparingly given until the green shoots appear. If planted in the garden, they should be six inches below the soil, and from two to four inches distant from each other. In boxes or pots, two inches deep is sufficient. The colors of the *Ixia* are very rich and varied, and the habit of the plant most graceful. They flower in February and March.

25. *Lily*.—The lily in beauty and stateliness yields to none of flora's treasures, and if imported bulbs arrive in sound condition, there is no reason why they should not answer well in this country. *L. Longifolium* and many others thrive well. Lilies do well planted in the flower bed or border, three or four in one spot, if left undisturbed. They will not bear being kept long out of the ground. After flowering when the leaves die down, they should be put away dry; if they have been planted in pots, until they start in October, when they may be re-potted and separated if necessary. In the flower garden, they must be placed five or six inches below the soil

and the earth must be light and rich. When flowering, they need a plentiful supply of water, and liquid manure occasionally. At this time also it will be well to soak the pots every few days in pans of water.

*L. Auratum.*

*L. Lancifolium.*—These varieties are among the most lovely. They can be selected according to individual taste from a good seedsman's catalogue of bulbs. Very careful packing is necessary for imported kinds, or they will not arrive in sound condition. Upon arrival they must be potted without delay.

26. *Narcissus.*—The soil for these bulbs should be rich and light. In the border they look well in lines or groups; the smaller varieties may be grown in pots. The jonquil narcissus and the little hoop petticoat are suitable. The treatment may be that recommended for hyacinths.

*N. Poeticus.*—White, with a red eye.

*N. Flore Pleno.*—Double white, are pleasing varieties, fragrant and beautiful.

27. *Oralis.*—Very pretty small plants of elegant habit, bearing a profusion of flowers. They require light and moderately rich soil, with a little silver sand. They are suitable for pots or rock work, and require the usual treatment for most bulbs, watering being discontinued when they die down at the end of April. They should then be left to dry in their pots, or kept in sand until they start in October, when they should be re-potted and at once exposed to the light.

*O. Bowiei.*—Bright crimson.

*C. Deppei.*—Rose purple.

*O. Floribunda.*—Rose.

*O. Cernua.*—Yellow.

*O. Versicolor.*—Crimson and white.

The above named are all good kinds. Many are obtainable in India, or may be imported.

28. *Ranunculus.*—The *Ranunculus* requires a retentive soil, good, well-decomposed stable manure being well mixed

with it, until within three inches of the surface, when the soil should be loam only, or half loam and leaf mould. Twelve inches of good soil is necessary for the successful culture of this flower, as most failures result from want of proper attention to the soil. The tubers should be planted in October. If in a box or bed, make a drill two or three inches deep, sprinkle a little sand at the bottom of the drill and plant five or six inches apart, pressing the tubers firmly into the soil, claws downwards, with the crown two inches below the surface, covering with sand. When watering, be careful not to wet the foliage. After flowering, the tubers must be taken up as the leaves turn yellow, for if left too long in the earth, they will start again and probably perish. If show flowers are desired, leave two buds only on a plant. The tubers are finer, and the flowers also, if the plants are not allowed to ripen seed. When taken up, dry them in the shade and keep free from damp, and as cool as possible, until the next planting season, in boxes of sand, or the boxes with trellis cover before named. They can be raised from seed, which should be sown in boxes filled with the same soil as given to tubers. To sow, first press the earth tolerably firm, then place the seeds eight to an inch, and water just sufficiently to settle the soil; then sprinkle a little fine earth over them, watering again with a fine rose, and expose to air and light, giving the morning sun only. When they are fairly grown, clear away all moss that may have grown on the surface, sprinkling a little fine soil mixed with powdered charcoal. When the leaves wither, allow the boxes to become dry. When the tubers are taken up, they must be dried gradually and kept in dry sand; they will flower the second year. Offsets must be managed in the same manner. For clumps and masses, the turban variety is the best. For single specimens, the Persian *Ranunculus*.

29. *Spáraxis*.—The flowers of the *Spáraxis* are large and double, with brilliant colors. These plants are dwarf in habit and require the same culture as the *Ixia*.

*Sparaxis Angelique*.—Pure white, with a yellow eye.

*S. Victor Emmanuel*.—Red and yellow.

*S. Grandiflora*.—Rich crimson, with yellow eye.

The plants form charming borders, and are very effective.

30. *Tigrida*, Tiger Flower.—A bulb bearing flowers of gorgeous beauty, but fading quickly, seldom existing a day. Their foliage is scant and open, making them thus more suitable as border plants: they look best when planted in clumps, and their fine brilliant flowers make a pretty contrast with their long tapering leaves.

*T. Paronica*—Is met with in most hill stations, and requires little or no care, but the greatest protection necessary: from wild animals who eagerly devour the roots. The petals of this plant are scarlet, with spots not unlike the pard's.

*T. Canariensis*.—Yellow, with scarlet spots.

*T. Canariensis*—*var.*

*T. Suchiflora*.—Yellow, with red spots.

*T. Speciosa*.—Dark scarlet and orange.

The *Tigrida* looks well in boxes, ten or twelve plants in each. The soil should be renewed to the depth of four inches yearly, and replaced with good rich earth. They flower in the hills in August. At their season of rest, water must be withheld.

31. *Tritonia*.—Flowers of noble habit, throwing up flower stems from three to seven feet high, surrounded with closely covered spikes of bloom sixteen inches to two feet long, of the most gorgeous colors. It is familiarly known as the "red hot poker plant." Some choice varieties are—

*T. Crocata*.—A fine salmon color.

*T. Delicata*.—White.

*T. Eclair*.—Scarlet.

*T. Pauline*.—Pink.

*T. Rosalis*.—A semi-double bright rose.

*T. Speciosa*.—Orange rose.



\* These plants flower about August, and in growth and habit are very similar to the *Sparaxis* and require the same treatment.

32. *Tropæolum*.—The tuberous-rooted *tropæolums* are slender, beautiful, and most graceful, small climbers; very charming when trained over a globe or other trellis, two, or three tubers being planted in a pot with equal proportions of sand, loam, and leaf mould.

*T. Azureum*.—A beautiful blue.

*T. Jarritti*.—Scarlet, orange, and black.

*T. Tricolorum*.—Scarlet, yellow, and black.

*T. Pentaphyllum*.—Scarlet and green.

*T. Polophyllum*.—Yellow, in long trusses, often two feet.

The two last-named are well adapted for borders.

These plants are grown with difficulty in the plains. They must be potted in a large pot as soon as they show signs of growing; water must be sparingly given until they have an abundance of roots. The pots must be well drained; the tubers do not bear disturbing.

33. *Tuberoses*.—The *Polyanthes tuberosa*, a charming plant, common to India, is very fragrant. The double Italian resembles the much-prized *Stephanotis*. The single variety will bear clusters of lovely white flowers six feet high. If the stems are cut down after flowering, others will spring up in succession. The flower stems must be supported. The plants may be grown in pots from bulbs or seed. A sandy loam is the soil best suited.

34. *Watsonia*.—Handsome and attractive bulbous plants, requiring the same treatment as *Gladioli*. Usually grown in pots, but can be planted out with success and good effect. If several bulbs are planted together, they should be removed without breaking the ball, when the flower spikes show color, and then planted where desired.

#### *Special Directions for growing a few favorite Flowers.*

1. *Aloysia Citriodora*.—The lemon-scented *Verbena*, a delightfully fragrant plant, attains the height of a large bush

in the hills? In the plains it is generally grown in a pot, and looks well trained on a trellis. It requires shade in the very hot weather, and it is benefited by being placed in the open air, in a situation not too sunny, during the cold season. Cuttings are readily made to strike in the cold weather, by placing them in shallow pans filled half way with sand, covered with a thin sheet of water, and placed under a glass. When the rootlets have fairly formed, transplant to a rich soil. As this plant often grows very straggling, it is a good plan to pinch off the tops of the shoots.

2. *Amaranthus*.—There are many new and very ornamental varieties of this plant, so prized for its brilliant foliage. The seed must be sown in July in boxes, and only dusted over with earth: the earth should have been previously damped, and in a crumbling state at the time of sowing. When the plants are two inches high, remove and transplant to pots, placing one in each. Prince's feather and Love-lies-bleeding are two good and well known kinds. Among the choice new varieties may be named—

*A. Atropurpureus*.—Growing to a height of three feet and nearly two feet wide, the foliage nearly hidden by the brilliant inflorescence. When in flower it has been likened to "a sheaf on fire."

*A. Bicolor*.—Deep purple lance-shaped leaves, the terminating ones being rich crimson.

*A. Salicifolius*.—The most beautiful kind known. It rises in the form of a pyramid, two and-a-half to three feet from the ground, which the lower branches touch. Its long, wavy leaves are most graceful and brilliant, changing from green to brown, bright red, and orange. The whole plant is of a drooping, fountain-like, form.

*A. Gigantels*, from Singapore—Attains a height of from four to six feet. The foliage is a sombre purple in the lower leaves, gradually increasing in brilliancy to a purple red, and yellow summit.

There are also several edible kinds, cultivated and eaten as a spinach.

3. *Anlirrhinum*.—This perennial is in India grown as an annual, and if sown in October blooms the same season; but is improved by being kept until the following cold weather and transplanted into rich soil.

*A. Majus Albus*.—White.

*A. Crescia*.—Scarlet.

*A. Delila*.—White, with carmine lips.

*A. Saratkee*.—Crimson, white throat.

The Tom Thumb varieties are exceedingly pretty and not exceeding nine inches in height.

4. *Asters*.—Most showy annuals, all delighting in deep rich soil. The beauty of the flowers is greatly increased by frequent waterings with liquid manure. They must not be planted nearer than ten inches if in a border, and one in a pot is sufficient. If for an exhibition, only three or four of the most perfect buds must be left on each plant, otherwise they need not be removed.

*Dwarf, Chrysanthemum-flowered.*

*Truffant's French peony-flowered perfection.*

*New Rise or large flowered dwarf peony.*

*Victoria.*

These are good varieties. Sow in October.

5. *Balsams*.—These showy annuals, suitable alike for the border or for pots, should be raised from imported seed, as they usually have more flower and less leaf than plants raised from acclimated seed. The usual time to sow imported seed is the beginning of September and August. For country raised, sow in pans or boxes filled with a light rich soil. When the rough leaves appear, prick out to an inch apart. Those intended for pots may be at once placed in them, those for the garden transferred to other boxes until six leaves appear. These plants are apt to damp off, if allowed to remain in standing water. Balsams are highly ornamental when grown

as standards. This is done by pinching off all branches. Air, light, and plenty of water are necessary to obtain strong healthy plants. A succession of these flowers can be obtained by sowing in November, but they will be dwarf and suitable only for a jardinette.

The new varieties are—

*B. Emperor*.—Dark-blue and white.

*B. King*.—Scarlet.

*B. Queen*.—Rose.

*B. Solferino*.—

*B. Carnation Striped*.—

*Smith's celebrated Strain*.

The *Rose flowered* and *Camellia flowered* are large and beautiful.

To obtain extra large flowers, it will be necessary to transplant at least four times, and it should be done when the pot is full of roots, exchanging the pots each time for a size larger. This may even be done 10 or 11 times.

The Cockscomb, *Celosia cristata* is treated in the same way, and if fine specimens are grown and afterwards planted in a bed, they make a splendid show.

6. *Begonia*.—This plant requires the same treatment as the tuberous-rooted kinds, and grow readily from cuttings, often from a single leaf. Some of the best known varieties are—

*B. Hybrida*.—Mixed.

*B. Pearcei*.—Velvety leaves, veined with lighter green and yellow flowers.

*B. Rosaflorea*.—Carmine.

*B. Echinosephala*.—White.

7. *Bignonia*.—These plants are extensive climbers and very effective. They nearly all bloom during the hot months. A few varieties only blossom in January, February, and March. They cover a large space, and require ample room to display their glossy foliage and handsome tubular flowers. They are

chiefly propagated by cuttings and layers, and can be raised from seed. After flowering, they must be well pruned and cut back. The soil should be moderately light and rich, and the plants freely watered when blooming. The varieties usually selected for the garden are—

*Bignonia Capreolata*.—Scarlet.

*B. Radicans*.—Orange.

*B. Chamberlaynei*.—Primrose.

*B. Incarnata*.—Lilac striped purple.

*B. Venusta*.—Vermillion.

*B. Undulata*.—A large shrub, with drooping branches and orange flowers.

*B. Quadricularis*.—A high growing shrub, with large rose colored flowers.

8. *Cuscuta*.—These lovely plants are rarely seen out of Bengal. They should be imported in wardian cases, which enables them to be conveyed to the North-West Provinces. They flower at the end of the cold weather. When the buds are swelling, previous to opening, give liquid manure made from cow-dung: it must be clear and not strong. A liberal supply of water is required when blooming. Confine in a hot-bed, if possible, to encourage growth, and re-pot, if needful, shortly afterwards. They require exposure after setting their buds, and protection from heavy rain.

9. *Carnations*.—In the plains, generally, these charming flowers may be grown to perfection. To raise them from seed it should be sown in October, in a box filled with a good light soil. The seedlings may be transplanted in March to another box, or a border, slightly raised and sloping, to prevent an accumulation of water. They require plenty of light. Pot separately, in October, in a mixture of loam, leaf mould, and well-decomposed manure from the bullock shed, adding a little sand. In November shoots may be layered, or merely pegged down like verbenas. They strike quickly. Matured plants flower in March.

Seeds may be imported in sealed packets, and selected varieties are—

*Self*.—One color.

*Flake*.—Two colors.

*Bezargee*.—Three colors.

*Fancy*.—Spotted.

The pod of the bloom generally requires to be tied about the middle, and the upper part of the calix opened down to the tie. It is an advantage when they do not need this. The proper sized pots for blooming are ten or twelve inches. They must be well drained. Always plant carnations in pairs, unless a grand display is required, when four may be inserted, as each plant only sends up one flower stem. When coming into flower, give occasionally a little weak liquid manure.

10. *Chrysanthemum*.—The common yellow kind is indige-  
nous. The large handsome varieties may be grown from seed,  
or cuttings if procurable. These plants require to be frequent-  
ly removed into good soil. Matured plants, after flowering,  
may be propagated by having the whole of the earth shaken  
from the roots and the healthier portions of the root broken  
off or cut into pieces, and planted singly in pots, boxes, or  
in a shady border of good well manured soil, at a distance  
of two inches apart, then well watered. If in pots, shift when  
full of roots, repeating this process as required. The suckers  
thrown up from the roots may be separated and planted in a  
bed in the same way as the divisions of the roots. The top  
of each shoot may be pinched off about a month before the  
buds show. Prune off all the side shoots excepting four to  
form a head. Let them remain until the flower buds are fully  
formed, then cut the earth round each plant with a spade, so as  
to form a ball and give the roots a partial check. At the end  
of a week pot separately. They will flower profusely and be  
perfect imitations of miniature trees. Layering is also a good  
method of propagation. Chrysanthemums require shelter from  
heavy rain. They must be re-potted in the month of October.

11. *Geranium*.—These plants can only be grown as annuals in India, and require sowing early in October. Rich soil is necessary, with an occasional supply of liquid manure when about to flower. Frequent shiftings benefit them.

12. *Daisy*.—*Bellis Perennis* may be raised from seed, also propagated by division of roots. Sow in a light soil in the month of October, in a box or border, and transplant as soon as they become crowded. In propagating by division of roots (in the month of October) select small pieces of root and plant, each separately in good fresh soil, either in the flower border, in lines, or as a ring round a bed. It is safer to take them up, and place them in well-drained pots or boxes, during the rains, under shelter, until the time of planting out. Those raised from seed, flower the same season. Daisies require to be often re-potted.

13. *Dianthus*.—There are many beautiful varieties of this plant; most of them requiring the same treatment. They all require a light rich soil. Sow seed in October. Treat as Carnation, Picotee.

*D. Sinensis*.—The Indian pink flowers freely as an annual.

*D. Heldewigii*.—Single and fine, with flowers three inches in diameter.

*D. fl. Pleno*.—As above, but double.

*D. H. Grandiflorus striatus Pleno*.—White ground, with broad flakes of deep velvety crimson.

*D. H. Lilacina*.—Lilac.

*D. Lacinatus*.—Large and deeply fringed, double and single.

*D. Barbatus*.—The Sweet William flowers the second season.

*D. Plurarius*, the Garden Pink.—Double, white, and laced.

14. *Fuchsia*.—In many stations it is very difficult to preserve these plants during the hot and rainy months, though by following the directions given for geraniums some will probably survive. On the whole it is less worth the trouble, as cuttings are so easily obtainable from the hills, and these grow

well and flower. Mature plants are very desirable if the distance is not too great. There are many very beautiful and new varieties in the Government Botanical Garden at Mussoorie, including the single and double kinds. Choice kinds are obtainable from England, in warden cases.

15. *Gardenia florida* (Gunder Raj) Cape Jasmine.—A very favorite shrub, bearing most fragrant, large, double, white flowers, similar to a small camellia. Grows to a large size, but is usually preferred when pruned to a compact, medium plant. It grows freely from cuttings and layers, and flowers freely at the end of February.

16. *Geraniums, Pelargoniums, Geraniaceae*.—These well known plants are of many kinds—large flowered, fancy, diadematum, zonale, bicolor, tricolor, and ivy-leaved. They can all be raised from seed or cuttings. To grow from seed, procure the best English, and sow in August, September, or October. The seeds germinate freely in pots or boxes, in the open air, not too much exposed to sun. A good drainage of charcoal or tiles, two inches deep at the bottom of the box, is necessary; then fill to within three quarters of an inch from the top with good black earth, mixed with a proportion of sand. Each seed should be planted separately, with a space between of three inches. Transplant when they have four or six leaves, lifting each plant carefully with an old tea-spoon or any similar implement, which will prevent the roots from being exposed. Most of them will flower in February and March. Tricolor geraniums are produced from the lateral shoots of ordinary zonal plants of certain strains, and are taken off the parent plant and thus propagated. It sometimes happens that seedlings do not show the variegations until the second year, or even later.

Cuttings may be taken in October from plants growing in the plains, or be procured from the hills. With a little damp moss rolled round a bundle of them, and the whole wrapped in wax-cloth or gutta-percha, with an outer paper



covering, they can be sent by pattern post, or banghy. Cuttings should be planted in a box or basket filled to within an inch of the top with leaf mould or sand, and be placed in the shade. If in pots, sink them either in the border, or a lagger pot, a box, or a hot bed. Press the earth just enough to hold the cuttings. The best cuttings are those taken from the side shoots that have not flowered, and are not more than two inches long. They should be taken off with a sharp knife. Cut off the bottom leaves close to the stem, leaving only the uppermost two. Place in a shady place to dry the wound, for one hour on a dry day, and two, if otherwise. Place the cuttings in the pots round the edge, inclining the leaves inwards, then give them a gentle watering, keeping them from the light until they form a swelling at their base; then reduce the shade gradually, and when they have roots an inch long, pot them off, shading again for a few days. To grow bushy plants, nip off the top bud; the lower side shoots will then break, and when these have made three leaves, they must be stopped. This stopping appears more suited to the hills than the plains, as early and vigorous growth is generally encouraged. Choice tricolor and other geraniums can be imported from England by P. & O. steamers; the small pots in which they have been grown being packed in ordinary deal wood cases. The plan adopted by Dr. Beaumont at Indore, who has been very successful with imported plants, is to turn the plants out of the small pots in which they arrive, placing them in larger, filled with slightly moistened soil, giving them no water until they sprout, and then very sparingly syringing them frequently, and covering each plant closely with a glass shade, placing them in a darkened room, and as warm as possible. A box covered with glass in a warm bath-room or a gentle hot-bed, with glass frame all over, would probably answer. A plan suggested by an eminent grower of these flowers, is to bind the stems with the moss in which they have been packed; syringing them freely;

keeping them during the day in a dark room; sprinkling water on the floor to create a steamy atmosphere; turning the plants out at night to benefit by the dew and coolness.

Geraniums may, with care, be kept through the hot and rainy seasons. Let them be placed in a very shady spot, protected as much as possible from the hot winds. If planted in the garden, let them have the benefit of the first good rain, then take them up and set them in a north verandah, keeping them nearly dry. Some of the ordinary scarlet and pink varieties will in most stations grow well if left undisturbed in the border. Those that are to remain in pots out of doors must be raised from the ground on stones or bricks. Liquid manure, particularly that made from goat manure, is a splendid thing for these plants when freely growing, and above all, when about to flower; it should be well diluted, and given once a week.

17. *Heliotrope*.—In the plains this delightful plant is usually seen in the flower border as a small bush, two or three feet high; but it may with advantage be trained upon a trellis, which it will soon cover. It may be grown as a standard by removing the lower buds and leaves, and, when about three feet high, letting it form a head: the effect is very ornamental. When growing for standards, sow the seed in October in pots, and transplant each plant to a larger pot, tying it to a stake. In the Neilgherries shrubs forty feet in circumference, and ten in height may be seen, filling the garden with fragrance. It is there grown to form bushes.

Propagate by layers in the cold season.

18. *Honey-suckle*.—The Japan honey-suckle, with white and yellow fragrant flowers is often met with in India and requires a trellis or arch as a support. It requires a good rich soil, and is propagated by suckers, cuttings, or layers. The trumpet honey-suckle, bearing scarlet flowers, is very ornamental, but scentless.

19. *Hoya*, Wax Plant.—There are several varieties of hoya all requiring similar treatment. The soil should be made very porous with a mixture of drainage material, leaf mould, cocoanut fibre, or moss, to within an inch of the surface. They may be placed in hanging baskets or grown on a trellis. The leaves should be frequently washed to preserve the plants in health and beauty. The hoya grows well from cuttings, or from a single leaf. It flowers in the hot and rainy season.

20. *Ipomoea*.—These charming plants are among the most lovely of climbers. Seed is sown in the rains, and germinates quickly. Being extensive climbers, they require a high trellis or pillar, or may be trained round the trunk of a tree. *I. Superba* is a perennial, and is grown from suckers, seeds, or cuttings. The Japan varieties are new and pleasing kinds.

*I. Coelestina grandiflora*.—Blue flowers.

*I. Coccinea*.—Small scarlet flowers.

*I. Hederacea Superba*.—Various—blue, white, violet, claret.

*I. Mexicana grandiflora*.—White.

*I. Quamoclit*.—Scarlet, white, rose, feathery foliage.

*I. Rubra Cerulea*.—Large light blue, very handsome.

21. *Larkspur*. *Delphinium*.—All larkspurs are hardy, ornamental, and free flowering. They thrive best in a deep rich light soil, but will grow in any other. If the soil is left undisturbed, plants will spring up the second year in great profusion. The long wished for scarlet larkspur has at last been obtained. It is dwarf, compact, and free blooming.

*D. Nudicaule*.—Scarlet.

*D. Consolida flore pleno Candelabrum*.—A dwarf stock flowering variety.

*D. Grandiflorum Coelest*.—Sky blue.

*Rocket*.—

*Hyacinth flowered*.

*Ranunculus flowered*.

**Larkspur** will not germinate until the cold weather has fairly set in : its time of sowing varies, therefore, in different stations and seasons.

22. *Lagerstræmia Indica*.—An ornamental plant, growing about four feet in height, with rose colored flowers. It blooms very profusely during the rains, when it is an object of great beauty. There are white and lilac varieties. It is propagated by seeds and cuttings, and requires to be pruned back after flowering.

*L. Elegans*.—A large growing shrub with fine panicles of lilac flowers, most ornamental.

23. *Lapageria Rosea*.—A magnificent climbing plant, bearing a rich display of bell-shaped pendant flowers, rose colored, spotted with white. Few climbers are equally lovely and effective. Grown from seed.

24. *Lobelia*.—The varieties of lobelia are all charming, the branching and drooping kinds are most suitable for hanging baskets, or vases on the lawn. The seed should be lightly sown, and dusted over with fine sand ; the pot should then be allowed to stand in a pan of water until the seed has fairly germinated, when it can be removed. These plants soon flag if water is withheld. The following are good kinds—

*L. Crinus Ramosiodes*.—Blue flowers.

*L. E. Partonia*.—Blue, with a white centre.

*L. Speciosa*.—Deep blue.

*L. Kermesina*.—Crimson violet.

The perennial lobelias may be raised from seed, and some can be preserved during the hot season ; or they may be grown as annuals.

*L. Fulgens*, Queen Victoria.—A fine scarlet.

Bull's new hybrids of *L. Fulgens* are choice flowers.

25. *Lophospermum*.—A handsome rose-colored creeper, with trumpet-shaped flowers. Seed should be sown in October ; when sufficiently advanced, may be trained on a trellis. It

requires good soil and plenty of room and may be kept through the hot weather.

26. *Lupin*.—These seeds, if hard, should be previous to planting soaked for some hours in hot water. Any soil suits these annuals. Plant two or three seeds in a spot, giving each a growing space of six inches. It is well to save seed, as it usually germinates more freely than that which is imported. If the tops of the shoots be pinched off, after the lower seed pods have obtained their full size, and the plants put aside in pots in a shady situation, the seeds will ripen by degrees; otherwise, and if left exposed to the sun, they will not mature.

*L. Affinus*.—Dark blue.

*L. Albo Coccineus*.—White and rose.

*L. Hirsutus*.—Large blue.

*L. Albus*.—White.

*L. Horsutissimus*.—Dark red.

*L. Inteus*.—Yellow, sweet scented.

*L. Mutabilis Roseus*.—Rose, very rich.

*L. Subcarneus*.—Blue and rosy white crimson.

The above are good named varieties.

27. *Magnolia Grandiflora*.—Bears in April very large handsome white flowers, and possesses fine glossy leaves, very ornamental, but propagated with difficulty. Gootee is usually practised.

*M. Pterocarpa*.—Is a native of India, a fine tree with large white blossom, most sweetly scented.

*Marandya Barclayana*.—A very elegant small creeper, mauve, pink, and white, snap-dragon-like flowers, particularly suited for training over a trellis by a verandah, or arbor. It constantly springs up self-sown from ripened seed. It can be grown in pots. Seed should be sown in October. It continues in flower for some months.

28. *Mesembryanthemum tricolor*.—A pretty, effective, prostrate plant, with cineraria-like flowers, pink and purple, well adapted for rock work. It requires a well drained soil, mixed

with drainage. Seed should be sown in October, and covered very lightly with fine sand.

*M. Tricolor alba*.—White, with purple or crimson centre.

*M. Crystallinum*.—The well known ice plant, with insignificant whitish flowers. These must be pricked out when they have four leaves, as when full grown, they will cover a space ten inches square. The leaves are much used for table decorations.

29. *Mignonette*,—*Reseda Odorata*.—Sow the seed in October, rather thinly, in the border where it is to remain, as mignonette is injured by being transplanted. This sweet scented flower is much grown in pots and the jardinette. Ordinary long narrow boxes, faced with caustic tiles, are very ornamental. There are many new and very fine kinds of this plant. *M. Amelliore* is of much more robust habit than the ordinary variety, with larger flowers, more deeply tinged with red. Three plants in a pot form a beautiful pyramid of flowers.

*M. Amelliore multiflora compacta*.—Is a very vigorous new kind, with thick bunches of reddish flowers.

*M. A. Pyramidalis gigantea*.—Giant mignonette, with very large flowers.

Parson's new white flowering is very pretty.

The new hybrid tree mignonette is a most pleasing variety: the raiser has grown this plant to a height of three feet with a circumference of eight feet, nine months from sowing seed; but in four or five months very good sized plants will be obtained. It must be grown on a single stem, thus: Place at the bottom of a flower pot drainage of old mortar and charcoal, then fill with fresh rich soil, mixing a handful of finely broken mortar with it; press the soil firmly and let it come to within three quarters of an inch of the top. Scatter a few seeds on the soil, placing three or four carefully in the middle, so as to ensure one good plant. Run a stick down to the bottom of the pot, and when large enough, tie the seedling loosely with soft cotton or wool. For fear of accidents one

or two other sticks may be put in. Either sink the pot or place it in rather a shady place and keep well supplied with water. Beware of earth-worms and see that the drainage is perfect. Soaking the pot occasionally prevents the soil from becoming sodden. Pinch off all the flowers and points of shoots after the second joint, and it must not be allowed to flower until it attains a good size; every faded flower being taken off at once causes it to remain in beauty, and much longer. Give air, light, and moderate sunshine.

30. *Mimulus*, the Monkey Flower.—Annuals of a very ornamental nature, flowering profusely the whole season. Sow the seed in October, in pans, mixing it with three parts of silver sand. The soil must be light, nearly half sand. Water by soaking the pans. When large enough, transplant each singly, keeping the pots in saucers of water. The under-named are favorite varieties:

*M. Cardinalis*.—Scarlet.

*M. C. Grandiflorus*.—Many beautiful colors.

*M. Cupreus Hybridus*.—Spotted varieties, superb and large.

*M. Neuberii*.—A charming variety.

*M. Repens*.—Elegant and trailing, purple and yellow.

*M. Roxlii*.—Yellow, dotted red.

There are also varieties with spots on a white ground.

31. *Myosotis*.—These plants must be treated as annuals, the seed being sown in October. If in pots, keep in a saucer of water. In Europe they are largely used as bedding plants, where they are very effective.

*M. Alpestris Rosea*.—Rose colored.

*M. Azorica*.—White and purple.

*M. A. Alba*.—A dense mass of white flowers.

*M. A. Cælestina*.—Turquoise blue.

*M. Palustris*.—Forget-me-not.

*M. Sylvatica* or *Clivedon blue*.—Bedding variety.

32. *Nasturtium*.—There are two varieties, the tall climbing, and the pretty dwarf. The latter, when planted in beds,

are very effective and brilliant, and if composed of Dwarf, Tom Thumb, Scarlet, and Crystal Palace Gem, are always attractive. Prepare the bed thus: Plant three seeds of scarlet at the points of a triangle, measuring from point to point eight inches, let this be in the centre of the bed. Draw round this triangle two consecutive circles, allowing a space of twelve inches between them as well as from the triangle points. In the first circle plant seeds of the Crystal Palace Gem, giving to each seed twelve inches of space. In the second circle, with the same distance between each seed, plant the scarlet variety, and arrange so that the seed in the second circle will be opposite the centre of the space between the seeds in the first circle. At the time of planting if the seeds be hard and very dry, soak them in luke-warm water for some hours. Press each seed firmly into the soil, covering them to the depth of the seed only. October is the usual time for sowing.

The soil must not be rich or the plants will run to leaf and produce but few flowers.

The climbing variety is suited for covering trellis work. If a thick dense screen is required, the seeds must be planted at intervals of five inches; the soil should be moderately rich to encourage the growth of leaf at the expense of the flowers. Some favorite kinds of Nasturtium are—

*Dwarf Tom Thumb*.—Bronze, crimson, yellow.

*Beauty*.—Yellow flushed crimson.

*Crystal Palace Gem*.—Sulphur maroon spots.

*Pearl*.—White.

*Commodore Nutt*.—Intense scarlet.

Of the tall kinds, the scarlet crimson and yellow with dark spots are much thought of.

33. *Nemophila*.—These much admired little annuals must not be sown before the cold weather has fairly set in. They can be sown either in pots or the border; if the former, when sowing, dust them over only, and allow the pots to stand in a saucer of water; do not water overhead. If the latter, and



the border is flooded, care must be taken that a thin sheet of water only is given, as this tender plant is very apt to damp off just above the soil. Should the sun strike the stems at the same part, they will wither. It is a good plan therefore to sow mignonette with nemophila, as the mignonette affords shelter. Some favorite kinds are—

*N. Maculata*.—White, blotched violet.

*N. Oculata*.—Blue-black centre.

*N. Elegans*.—Maroon black, white margin.

*N. Alba*.—White.

*N. Purpurea*.—White, broadly edged with purple.

34. *Nierembergia*.—These plants, though perennials, are usually grown as annuals: they flower the first year, and are very ornamental, being very suitable for hanging baskets. Sow when the cold weather has set in, in pots. A light soil suits them best.

*N. Gracilis*.—White-veined lilac.

*N. G. Alba*.—White.

*N. Nigricans*.—Deep blackish crimson.

The above named kinds are usually selected.

35. *Pansy*.—This plant is usually grown as an annual in the plains. It is very necessary for its successful culture that the best seed alone should be sown. Pansies require great attention, and answer best in a tolerably light, but rich soil, with a large proportion of thoroughly decomposed cow-dung. Sow in the month of October. When the young plants have six leaves, pot them out singly, disturbing the earth in the seed pan as little as possible as all the seeds do not germinate at the same time. The plants when in bloom must be placed in a shady place, and in hot weather they cannot develop their flowers unless protected from the hot rays of the sun, and well watered. Cuttings may be taken from the side shoots. When an inch and-a-half long they grow readily, especially under a glass. If plants are intended for an exhibition do not remove the side shoots, as they should be shown full of bloom. Cover the pots.

There are many beautiful varieties such as the deep-colored, white, blue, yellow, bronze, Belgian, striped, and variegated kinds, pelargonium flowered, yellow and white ground with crimson and purple blotches.

36. *Passiflora*.—Flowers of great beauty and very ornamental, they grow quickly : they are well adapted for arbors and places where dense foliage is required, requiring a trellis as a support. These plants are propagated by cuttings, layers, suckers, —also by seed. When they are vigorous, they require pruning like vines, as the young shoots of one year furnish the wood for the flowers of the following season. Some choice named kinds are—

*P. Acerifolia*.—Light blue, slender, and beautiful.

*P. Cærulea*.—Greenish white, with blue rays.

*P. Cærulea Racemosa*.—Lilac, with white rays.

*P. Heterophylla*.—Yellow, with crimson.

*P. Foetida*.—With small insignificant flowers, bearing a fruit similar to a green Cape gooseberry, enclosed in a pretty delicate fibrous net-work.

*P. Gracilis*.—White.

*P. Kermesina*.—Crimson.

*P. Middletoniana*.—Beautiful pale blue flowers, with white rings.

*P. Racemosa*.—Scarlet. This plant should be grafted on a stronger variety.

37. *Penstemon*.—Plants bearing showy bell-shaped flowers, chiefly blue, purple, and scarlet. They blossom profusely and require a good loamy soil. They may be propagated by cuttings, division of roots, or from seed. Cuttings require to be placed in a sandy soil. Seed should be sown in October. These plants give their flowers in the hot and rainy season. Noted kinds are—

*P. Acuminatus*.—Bluish purple.

• *P. Barbatus Torregi*.—Scarlet.

*P. Cobæa*.—Blue and yellow.

*P. Digitalis*.—White & tinted blue.

*P. Coccineus*.—Scarlet.

*P. Grandiflorus*.—Lilac purple flowers, two inches long.

*P. Lobbi*.—Yellow.

*P. Zaffranus*.—Bright blue, superb.

38. *Petunia*.—These plants are best when grown in a light rich soil. It is better to obtain good fresh mixed seed from Europe, as many beautiful double kinds are often obtained, and it should arrive in time for sowing in October, so that the plants may flower the same season. Flowers from self-sown seed are small and the plants very difficult to get out of the border. Plants of choice kinds should be made from cuttings: they grow readily in pots, baskets, or the border.

*P. Grandiflora marginata*.—Green edged.

*Hybrid picturata*.—Bright crimson, marbled with white.

*P. H. Tigrida*.—A charming plant, blotched with crimson and purple on a white ground.

*P. Multiflora*.—Red.

*P. Nyctaginiflora*.—White.

*Viola*.—Purple.

39. *Phlox Drummondii*.—Flowers well suited to the border. Sow seed in October, covering to the depth of the seed only with earth. Rich good soil produces an abundance of flowers. Good named varieties are—

*Phlox Drummondii*.—Scarlet.

*P. D. Black Warrior*.—Crimson.

*P. D.*—White.

*P. Oculata*.—White crimson eye.

*P. D. Isabellina*.—Yellow.

40. *Portulaca*.—Prostrate plants. Stems and leaves resembling the mesembryanthemum. Flowers brilliant and attractive. These plants are well suited for rock work exposed to the full blaze of the sun.

The soil required for these splendid plants is a light sandy, mixed with pieces of pot drainage. When sowing seed, mix

it with fine sand, and do not cover it over. Allow the pot to soak in a pan of water until the earth becomes damp, not sodden, then place it in the shade until the young plants have fairly started, when they may be exposed to the sun. When the plants have bloomed, do not disturb the earth in the pot, but dust a little earth over the top to the depth of an eighth of an inch, in the following season young plants will appear from self-sown seeds. Young seedlings can be transplanted without danger. Some favorite kinds are—

*P. Caryophylloides*.—White striped crimson.

*P. C. Aurea*.—Crimson striped gold.

*Rosea*.—Rose.

*Thellusoni*.—Scarlet.

*Thorburni*.—Yellow.

*Grandiflora*.—Splendid double mixed.

41. *Primula Sinensis Fimbriata*.—Sow good imported seed in pans or boxes, at the end of September. As the young plants increase in size, thin them out and transplant to pots, removing with them as much earth as possible. Care is necessary when watering, that the woolly leaves are not sprinkled. In the hills the seed may be sown in June, July, or August. The kinds that succeed best in India are those that flower about January.

*P. Sinensis fimbriata alba*.—White.

*P. S. fimbriata rosea*.—Rosy crimson.

*P. S. Alba fl. pl.*—Double white.

*P. S. Rosea fl. pl.*—Double carmine.

The fern-leaved, white and carlet, and the new carnation striped, are really superb. It is rarely that these plants are seen to any very great perfection in the plains. Some fine specimens have been seen from seed sown in the hills, and the plants removed to the plains in November. Great care is necessary in packing them, as the leaves are apt to crush, and each lost leaf, at the early period of existence, is of vital importance.

*Rose*.—Of all flowers, perhaps the most extensively grown and the best suited to Indian gardens, being a plant indigenous to eastern climes. The formation of a rose garden is attended with little trouble, and no very great expense. Roses can be sent from England at their season of rest about November, and travel perfectly well in ordinary deal cases, with their roots enveloped in a little dry moss. Any good nurseryman will pack them, and they can be sent by steamer via Suez Canal. It is wise to give an order two or three months before the time of despatch, to permit the roses to be gradually prepared for their journey. On their arrival, place them in a shady room, opening the lid of the box the first day but partially, entirely removing it the second; on the third day pot the plants in damp soil, not wet, binding the moss round the branches. Give no water to the roots for ten or fourteen days, but syringe the stems frequently, and throw water on the floor and walls of the room to create a moist atmosphere: gradually expose to air and light when the plants shew signs of starting. If to be planted in a border, they will at first require to be shaded.

*Position*.—A good place to select for planting is by the side of a water-course, as they always have a supply of water without entailing the slightest additional trouble. If well arranged, as regards kinds and colors on each side of the main walk, they will show to great advantage.

Roses may be grown in many ways and are charming in all. Pillars, bowers, trellises, beds, arches, hedges, standards, dwarfs, &c., &c.—In the formation of a rose garden, so arrange it that the trees may have the sunshine on them from the early morn to 9 or 10 o'clock, and after that time be "in shadow and repose." To effect this the garden must extend from north to south, rather than from east to west, the form being oblong or semi-circular. The western side must be protected with a screen or hedge and must be high. A belt of shrubs affords a good protection: Care must be taken that they are not exposed to drippings from shrubs or trees.

*Soil.*—Roses will grow in ordinary garden soil, if properly cultivated. It should be dry, carefully drained, and deeply manured. Should the soil be stiff clay, it must be made friable and porous, for which purpose burnt clay is most suitable. Collect a large heap of prunings and weeds, decayed vegetables, and a few tree roots, placing clay in the centre, with the quickly burning materials around and below, covering the whole with clay. As the flames burst out, stop them with fresh clay; in this manner the clay will be gradually burnt. The ashes are to be mixed with the soil in which the roses are to be planted. If on the contrary, the soil is poor and light, it must be enriched with the addition of good loam.

*Manures.*—These are of vital importance, the vigour and beauty of the flowers depending on a generous supply—nothing is better than stable manure or that from the cow-shed: to which may be added the sweepings of the goat house, and poultry yard. A good supply should be dug in about October. If after pruning the roses the soil be removed from the roots, leaving them exposed for a few days, then filling in with the native mixture of cow-dung, mud, and oil-cake, they will produce fine flowers about five weeks afterwards. Surface dressings are recommended to be applied when the flower buds are formed and swelling. The strongest stimulant is composed of horse droppings mixed with liquid manure, and probably some oil-cake would be a good addition; let all thoroughly incorporate for two or three days before using: this being so strong, it is not adapted to mix with the earth about the roots. If this is applied a little before the usual Christmas rains, the plants will at once reap the benefit of its application. Liquid manure made from goat droppings, applied every few days when the buds begin to swell, is thought by some to be superior to all others.

*Planting.*—In planting roses remove the earth to the depth of a foot and-a-half with a diameter of two feet, fill in with two-thirds rich loam, well mixed with one part of well rotted

manure. If a surface dressing of manure be placed over the soil, round the trees in March, about two inches deep, they seldom suffer from drought.

In watering roses, whether flooding or by hand, do it thoroughly. A couple of pailfuls to each rose, every two or three days, is far better than a caudal every day. Syringe them well in the evenings during the hot weather. Remove all aphides, grubs, and beetles. Should blight appear, apply sulphur, or soap and water.

*Propagation.*—Having procured a selection of choice roses, they may be increased to any extent desired by budding them on stocks of the well known Rose Edouard; also by cuttings, and layers. The best time for budding is from the 15th of November to the 10th of January, at which time the bark parts easily from the wood. For forming low compact bushes, it is a good plan to remove a little earth from the very lowest part of a stem, and there insert the bud, which will then put forth roots of its own. Some few roses are difficult to propagate by cuttings, but in most instances if inserted on the sloping side of a water-course in a shady spot, at the beginning of the cold season, they will grow vigorously, and stronger than if more trouble and care were taken with them. Some kinds also strike readily during the rains.

*Arrangement.*—If the Rose Garden be partially surrounded by sloping banks, or the ground be varied by natural irregularities, it may be arranged in a more picturesque manner than a flat unbroken surface presents. Artificial mounds may be raised and covered with roses, and by introducing pillar and weeping roses and tastefully arranging the beds and borders with due regard to height and color, monotony may be avoided. Arches of roses form appropriate entrances, and in some special corner a rose bower is very ornamental. Rose hedges have already been mentioned: they are always beautiful when kept neat and cut. All the ground work of this garden should be turf, not forgetting to leave space

round each plant free from grass, as the near neighbourhood of roots is most detrimental to the rose. The French plan of forming an edge to a bed or border, either in the Rosery or elsewhere, of roses pegged down, is well worth a trial, as it only requires a little time and patience in confining each shoot. *Souvenir de Malmaison* and *Geant de Battailos* are effective in this manner. The Persian yellow forms a magnificent bed. When pruning out, thin out the shoots freely: those left should not be shortened unless very long and weak, when, take off four or five buds from the end, and then peg down, to their full length, along the ground. All the buds will break and produce flowers on short upright shoots, nearly the entire length of the shoots. *Crimorsic superieure*, a brilliant crimson rose, and *Mrs. Bosanquet*, a lovely pale rose, also form charming beds. When the plants are planted, spread short manure over the beds. The first year prune down to three eyes of last year's growth. When they have grown freely, peg down, and shoots not required, cut to three or four eyes.

• Roses grown on their own roots or dwarf standards are also appropriate for beds. Some graduate the heights, having tall standards in the centre surrounded by those of medium height, and these again encircled by the lower growing kinds. When standards are arranged in rows, two feet is a pleasing height, and if fronted with lower standards, the effect is heightened. Pillar roses must not exceed in height twelve feet, but the usual size is six to eight feet. The iron rods or supports must have their prongs very firmly fixed one or two feet below the soil. These roses require a very light rich soil and a liberal supply of manure.

*Climbers.*—No rose is more magnificent on a wall or trellis than *Marechal Neil*. This most lovely and unequalled flower with its delicate yellow hue deepening towards its centre, large and beautifully formed, fragrant and lasting, quick in growth and graceful in habit, is simply perfect and unrivalled. *Souvenir de Malmaison* for this purpose is best grown upon



its own roots ; Gloire de Dijon is splendid grown as a climber ; Climbing Devonensis is also effective and beautiful ; General Jacqueminot and Geant des Battailles can also be grown as climbers.

42. . An effective way of growing roses is in painted tubs. These should be on supports raised slightly off the ground. If several are placed in a line and the colors well arranged, they make a fine display. The soil must be frequently renewed, and liquid manure applied when the flower buds are forming. It may be useful to those who intend to show cut roses to know that the usual dimensions of the boxes now used for this purpose are— for twenty-four roses, length four feet, breadth one foot six inches, height of the back of the box, six and-a-half inches, front, four and-a-half inches;—for eighteen roses, three feet;— twelve roses, two feet two inches;—six roses, one foot six inches. At each end nail a strong piece of wood, two inches below the top of the box, and on to these are fixed six slips of wood, one inch and seven-eighths wide and three quarters of an inch deep, extending the length of the box : the upper and lower strips being one-eighth of an inch within the box, and the other four arranged to leave six spaces, one and a quarter wide, three for the flowers, leaving each alternate space vacant. Some place brown paper on the laths, and over this spread moss or fern fronds. When not procurable, the laths should be painted green, or they may be covered with green cloth, and pretty bits of foliage should be thickly spread over. In arranging the boxes, the colors must be pleasingly contrasted, the largest roses placed at the back of the box, the medium in the centre, and the smallest in front. Tubes of zinc or tin are required, four and-a-half inches long, two inches in diameter at the top, diminishing to about one inch in the middle of the tube as observed in an ordinary funnel, but more gradual. Into these are fitted removable tops, like that part of a candlestick into which the candle is fitted with the rim attached, and on this rests the rose. These tubes are usually priced at four

shillings a dozen in England. When required for use, remove the tops, pass the stalk of the rose through, and replace after filling the tube with water. Cards must be inserted into cleft sticks by each rose, with the name legibly written; the regulation size of the cards is three inches long and one wide. Roses may be preserved for some hours, or even for a day, by a protection being fitted over, such as a plaintain leaf or cabbage leaf.

AN ABBREVIATED LIST OF CHOICE ROSES.

*Climbing Roses.*

*Alice Gray*.—Blush cream.

*Fortune's Yellow*.—Coppery yellow.

*Queen of the Belgians*.—White.

*Ruga*.—Flesh color.

*Amalis*.—Purple crimson.

*Gracilis*.—Pink.

*Moss Roses.*

These lovely roses are very suitable to the hills.

*Alice Leroy*.—Light pink.

*Celina*.—Crimson.

*White Bath*.—White.

*Hybrid China Roses.*

*Brennus*.—Large crimson

*Chénédolé*.—Crimson, suitable for pillars.

*Double-margined hip*.—Cream-white, with pink edges.

*Comtesse de Lacépède*.—Silver blush.

*General Jacqueminot*.—Crimson.

*Madame Plantier*.—White cluster.

*Magna Rosea*.—Pink.

*Vivid*.—Crimson, a fine pillar rose.

*Hybrid Bourbon.**Charles Duval.*—Rose.*Coupe d'Hebe.*—Pink.*Great Western.*—Crimson and purple.*Paul Perras.*—Shaded rose.*Dumask.**Chateaubriand.*—Bright red.*La Ville de Bruxelles.*—Rose.*Madame Hardy.*—White, very beautiful.*Madame Stottz.*—Lemon.*Pope.*—Crimson purple.*Semiramis.*—Rose, with light brown.*Hybrid Perpetuals.**Admiral Nelson.*—Deep crimson.*Alphonse Damais.*—Brilliant scarlet.*Admiral la Pérouse.*—Bright red, changing to violet.*Anna de Dresbach.*—Large, bright rose.*Baronne Prevost.*—Pale rose, very large.*Baronne Adolphe de Rothschild.*—Fiery red, good form.*Bernard Pulissy.*—Rich carmine.*Caroline de Jansal.*—Flesh, with blush edges.*Charles Lefebvre.*—Red, with purple centre.*Comtesse d'Orleans.*—Blush rose.*Claude Million.*—Velvety carmine.*Christian Puttner.*—Bright purple.*Duc d'Rohan.*—Bright red, large and full.*Duchesse de Morny.*—Rose, very double.*Duchesse d'Orleans.*—Lavender blush.*Eugene Appert.*—Bright crimson.*Emperor de Maroc.*—Dark velvety purple.*Françoise Lacharme.*—Carmine red.*Gloire de Santaney.*—Purple red.*Geant des Batailles.*—Brilliant crimson.

- General Washington*.—Brilliant red.  
*General Brea*.—Deep pink.  
*John Hopper*.—Rosy crimson, lilac-tinted petal.  
*Jules Magotten*.—Carmine, a good pillar rose.  
*John Waterer*.—Light crimson.  
*Louise d'Arzens*.—Creamy white.  
*Lady Stuart*.—Light pink.  
*Lord Raglan*.—Bright crimson.  
*Louis Peyronny*.—Silvery rose.  
*Madame Hardy*.—White clusters.  
*Madame Hector Jacquine*.—Rose, shaded with lilac.  
*Madame Fidol*.—Flesh, shaded with rose.  
*Madame Domage*.—Superb cherry.  
*Madame Julia Darin*.—Crimson violet.  
*Madame Charles Wood*.—Rosy red.  
*Mademoiselle Bonneure*.—Pale flesh.  
*Murillo*.—Velvet purple, with carmine shades.  
*Marechal Vaillant*.—Bright centre, reddish purple.  
*Marechal Forey*.—Red, velvety crimson.  
*Maurice Bernardin*.—Vermillion clusters, pillar rose.  
*Oriflamme de St. Louis*.—Scarlet crimson, pillar rose.  
*Princess Alice*.—Bright rose.  
*Parmentier*.—Rose.  
*Prince Camille de Rohan*.—Velvet crimson.  
*Reynold's Hole*.—A large full pink.  
*Robert's Fortune*.—Vivid red, double cupped.  
*Reine des Fleurs*.—Pink-shaded purple.  
*Senateur Taise*.—Showy, 1 1/2 large.  
*Souvenir de M. Rousseau*.—Carmine.  
*Sœur des Anges*.—Flesh.  
*Senateur Reveil*.—Deep crimson.  
*Triomphe de Lyons*.—Deep crimson.  
*Thomas Rivers*.—Rose, deep colored.  
*Turenne*.—Scarlet crimson.  
*Viscountess Douglas*.—Rose.

- Fulcan*.—Violet purple.
- Victoria*.—Pale flesh.
- William Paul*.—Crimson red.
- William Griffiths*.—Lilac rose.

*Bourbon Roses.*

- Adelaide Bongere*.—Crimson purple.
- Apolline*.—Light pink.
- Acidalia*.—White, tinted with rose.
- Aurore du Guide*.—Crimson, tinted violet.
- Baron Gonello*.—Lilac pink.
- Bouquet de Flore*.—Pillar rose, carmine.
- Comtesse de Barbantane*.—Light blush.
- Comte de Montgo*.—Deep crimson.
- Catherine Guillot*.—Fine lilac.
- Dr. Berthet*.—Bright crimson.
- Emotion*.—French white.
- La Quintime*.—Crimson purple.
- Prince Albert*.—Rosy crimson.
- Queen*.—Fawn color.
- Reveil*.—Dark crimson.
- Revd. N. Dombrain*.—Brilliant carmine.
- Souvenir de Malmaison*.—Pale flesh, very beautiful.
- Victor Emmanuel*.—Crimson purple.

*Tea-scented Roses.*

- Abricoté*.—Rosy fawn.
- Adm*.—Rose.
- Alba Rosa*.—White, rose tinted.
- Bongere*.—Glossy bronzed.
- Comtesse Orwaroff*.—Rose and fawn.
- Duc de Myenta*.—Rose-tinted fawn.
- Devonensis*.—Creamy, white-tinted rose.
- Gloire de Dijon*.—Fawn, tinted with salmon.
- Gonball*.—Bright rose.

- Louise de Savoie*.—Pale yellow.  
*Madame Willermaz*.—White, with salmon centre.  
*Moire*.—Flesh-shaded fawn.  
*Madame Charles*.—Sulphur yellow, salmon centre.  
*Maréchal Niel*.—Deep yellow, large and double.  
*President*.—Iris rose, with fawn.  
*Rubens*.—White-tinted rose.  
*Souvenir d'Elise Fardon*.—Creamy white.  
*Souvenir d'un Ami*.—Bright rose.  
*Triomphe de Guillet*.—White shaded salmon.

*Noisette Roses.*

- Le Libert*.—Pure white rose.  
*Lacina*.—Crimson, salmon fawn.  
*Clotilde de Gold*.—Pale straw, yellow centre.  
*Edmond d'Al*.—Pure white, pillar rose.  
*Lamarque*.—Pale straw, lemon centre.  
*Ophir*.—Copper.  
*Solfaterra*.—Sulphur.  
*Triomphe de Rennes*.—Pale yellow, deep yellow centre.

*Austrian Beauties.*

- Copper*.—Single coppery red.  
*Double Yellow*.—Pale yellow.  
*Persian Yellow*.—Golden.

43. *Salvia*.—These very showy plants are usually raised from cuttings, and strike readily if placed in the ground as soon as they have been removed from the parent plant, and kept well watered. If the scarlet variety is required to grow high, say to five or six feet, it should be trained on a trellis. If dwarf and bushy plants are preferred, plant the half edgeways, and peg down the plants. When the shoots grow perpendicular either peg down again, or take off the top to make them shoot out. The blue does not grow as high as

the red. Cuttings bloom the second year. The salvia will not bear much sunshine.

*Salvia Fulgens*.—Scarlet.

*S. Splendens*.—Scarlet.

*S. Cardinalis*.—Scarlet.

*S. Augustifolia*.—Blue.

8. *Patens*.—Fine blue; does not live long in the plains.

The undermentioned kinds are frequently raised from seed—

*S. Candilabrum*.—Deep violet, spotted white.

*S. Chronantha*.—White.

*S. Saponica*.—Dark blue, and dark red foliage.

*S. Americana*.—Brilliant scarlet.

44. *Saponaria calabrica*.—A very effective low growing annual, bearing a profusion of flowers, bright pink. A moderately rich soil is required, and the seed should be sown in October.

*S. C. Alba*.—A white variety.

45. *Stephanotis*.—A handsome climbing plant, bearing during the rains clusters of very fragrant flowers of a fine white color. This plant requires a trellis or other support. In the rains cuttings may be taken and placed in silver sand with a glass protection; it is well not to remove the cuttings before the end of February. If the weather is unusually cold the plants will need covering of a light nature; pot off in March and treat as mature plants. The soil should be the usual garden description.

46. *Stocks*.—The different varieties of the Ten Week and Emperor Stocks are the most desirable kinds to raise from seed, which should be of the best quality in order to get double plants. Many large growers recommend the seed to be sown in pots, and allow the seedlings to become pot bound, when they should be removed to large pots, filled with rich soil so necessary for these plants. Other gardeners recommend the seed being sown where it is to remain for flowering, thinking they receive too great a check by transplanting.

The undermentioned are good named varieties—

*Dwarf German Ten Week.*—Either mixed or distinct colors.

*Large Flower German Ten Week.*

*New large flowered Pyramidal German Ten Week.*

*Perpetual Emperor.*—Superb for beds or pots.

*The new large flowering Emperor.*—Perpetual, very choice.

47. *Sweet Peas.*—These charming flowers require the same culture and soil as garden varieties, but are usually grown in circles in place of lines. The seed should be previously soaked and allowed to drip before planting. When nine inches high, place supports around them, or this may be done at the time of planting. Those recommended to be grown are—

*Incincible.*—Scarlet.

*Incincible.*—Black.

These are new and very striking, and the color of the first-named most brilliant.

48. *Thumbergia.*—A lovely climbing plant for a trellis, hanging baskets, or vases. Nearly all the varieties are common to India, and most readily raised from seed. Care is required in gathering it, as the pods burst suddenly, and cast the contents. Sow in October.

*T. Alata.*—Buff, with a purple throat.

*T. A. Alba.*—White, with a purple throat.

*T. A. Aurantiaca.*—Orange, with purple eye.

*T. A. Bakeri.*—Purple and white.

*T. Coccinea.*—Scarlet.

*T. Grandiflora.*—A large trailing shrub covering, in a wild state, large trees, but capable of being cut and adapted for screens: flowers in the cold weather, bears very large pale blue flowers.

*T. Laurifolia.*—Similar to above, the leaves differing.

49. *Verbenas.*—Nothing adds so much to the beauty of the border as these free flowering plants. Seed should be sown in September, in good rich soil under shelter. When the young seedlings are three inches high, prick out and place in



the border, or in pots, giving each a growing space of a foot. An excess of damp is baneful, therefore wherever they are planted, drainage of the most perfect kind is absolutely necessary. English seed frequently fails, it is better therefore to obtain good seed from well known public gardens, or young plants. Verbenas require to be pegged down, whether in borders, pots, or vases. They grow freely from layers or cuttings.

50. *Vinca*.—*Vinca Major*, the English Periwinkle, bears its well known blue flowers about February. These free flowering plants should be supplied with light soil: they are very effective in vases and pots, and look well in a border: raised from seed or cuttings.

*V. M. Alba*.—White, rose-eyed.

*V. Alba*.—White, large flowers.

51. *Viola Odorata*.—These sweet little flowers, so well known, are easily cultivated by seed or division of roots. They require a light good soil, and great shade, either under a bush sheltered from the scorching winds, or they may be grown in pots. Nearly all the varieties can be obtained from the several Botanical Gardens and travel well by post. There are single purple and single white, and double purple and double white kinds.

They do not bear much rain.

*Wall Flower*.—This old favorite does not flower well in Lower Bengal, but in the Central and North-West Provinces it does well. It should be raised from imported seed. The double varieties are very fine, bearing spikes of flowers resembling stocks, but they are not so easily grown as the single. Ordinary garden soil suits these plants, and seed should be sown in October. The *Black Prince* is newest and choicest.

52. *Whitlaria*.—A pretty annual, bearing bell-shaped flowers. Sow in October the undernamed—

*W. Gloriosaoides*.—Gloxinia like flowers, white and blue.

*W. Grandiflora*.—Violet purple.

*W. G. Alba*.—White.

53. *Wigandia*.—The *Wigandias* are much admired and as greatly used for table decorations, the foliage being so beautiful. They are grand plants with enormous richly veined leaves, quickly grown and of splendid habit.

*W. Caracasana*.—Lilac.

*W. Urens*.—Violet.

*W. Figiera*.—A noble plant, with glaucous foliage, much grown in Continental Gardens.

54. *Fucca*.—Common to India, of noble habit and highly ornamental, and well suited for lawns.

*F. Aloifolia*.—Leaves tipped with long hard thorns, bearing pretty bell-shaped small white flowers. Bears in July and August, and is grown from seed or offsets.

*F. Rubra*.—A very effective red.

*F. Variegata*.—Striped, and highly ornamental.

*F. Gloriosa*.—White, a large variety, suited only for large gardens; leaves of a fine glaucous hue.

### Ornamental and Flowering Shrubs.

*Arbor Vitæ, Thuja Orientalis*.—A shrub valued for its splendid dark colored foliage.

*Acacia Houstoni*.—A high growing shrub, bearing in the hot season handsome crimson flowers.

*Aloysia Citrifolia*.—A large sweet scented shrub, growing ten or twelve feet high in the hills. A small shrub in the plains; known as the lemon-scented leaved verbena.

*Aphelandra Cristata*.—Very beautiful, with scarlet flowers.

*A. Fulgens*.—Leaves dissimilar to the above, with larger clusters of flowers.

*Barteli Cristata*.—A very bushy shrub, bearing a quantity of pretty blue flowers.

*B. Rosea*.—A dwarf variety, valued for its abundance of light crimson flowers.

*Bugainvillea Splendens*.—A native of South America, now

extensively grown in India, a blaze of purple bracts at certain seasons. Requires strong supports.

*B. Aurantiaca*.—A pretty yellow variety.

*Cassia Alata*.—A yellow flowering shrub valued as much for its foliage as for the deep tint of yellow in its petals.

*Eranthemum Crenulatum*.—Bears white flowers, marked with  
mauve.

*E. Neroosum*.—Bears blue flowers.

*E. Racemosum*.—A dwarf kind, with pink or white variegated petal.

*Gardenia Florida*.—The Cape Jasmine, a beautiful shrub, with double camellia-shaped white flowers. There are several varieties.

*Geiskomeria*.—A shrub with beautiful foliage, bearing at the end of the cold season handsome scarlet flowers.

*Heliotropium Peruvianum*.—A large shrub in hill stations, but a dwarf shrub in the plains. Flowers purple, and highly fragrant. There are also blue and white varieties.

*Hibiscus Mutabilis*. A high growing shrub, bearing flower of a fleshy white, shading to pink.

*H. Tortuosum*.—A variety having purple flowers, changing to a deep red when fading.

*H. Heterophyllus*.—A small kind, producing flowers almost white, inclining to pink.

*H. Tricolor Japan*.—Bears rose-colored flowers, with crimson blotches.

*H. Rosa Sinensis*.—Flowers a brilliant scarlet.

*Ixora Acuminata*.—A beautiful shrub, with white blossom and handsome foliage.

*I. Coccinea*.—A scarlet variety.

*I. Lanceolaris*.—Flowers white with a greenish shade.

*I. Ragoasula*.—This shrub is constantly in flower and bears pretty rose-colored flowers.

*Jasminum Grandiflorum*.—A shrub well known in most native gardens under the name of Chumbelee. Bears a pro-

fusion of white flowers with a powerful perfume. . . .

*J. Angustiflorum*.—An ever-green, bearing white star-shaped flowers, sweetly scented. . . .

*Jasmine Tuscan*.—Bears white flowers, very ornamental.

*Juniper*.—The low spreading habit of this shrub, with its handsome foliage, renders it a favorite for banks. There are several varieties. . . .

*Leonia Spectabilis*.—A shrub worthy of a place in every flower garden on account of the fragrance of its leaves when crushed, its pretty little pink flowers, and the very long time it continues in bloom. . . .

*Myrtus Communis*.—The myrtle, easily cultivated and very hardy. Bears delicate white flowers, and forms a good shrub for a border. . . .

*Palma Christi*.—This beautiful shrub, with its handsome heads of crimson, is very ornamental. . . .

*Phlogacanthus Thyrsiflorus*.—A high growing shrub with a light foliage, bearing flowers of a brownish color. . . .

*Plumbago Capensis*.—A very handsome large shrub, bearing a profusion of lavender colored flowers. . . .

*Poinsettea Pulcherrima*.—A gorgeous shrub, with scarlet bracts. Young plants are the most effective. . . .

*Poinciana Gilliesii*.—A low growing shrub with feathery leaves, very handsome, with brimstone-colored petals and rose stamens. . . .

*Rapheolepis Indica*.—A very beautiful shrub, bearing an abundance of white flowers. . . .

*Rondeletia punicea*.—A very ornamental shrub, bearing handsome orange-scarlet blossom. . . .

*Spartium junceum*.—A broom, giving a profusion of yellow flowers. . . .

*Tabernaemonta Coronaria*.—The moonbeam shrub, producing large double pearly white flowers. . . .

*Wistaria Sinensis*.—When this shrub can be made to flower, nothing is more beautiful than the large handsome

purple flowers, contrasting so effectively with the dark foliage around them.

*Orchids.*

This Chapter is not intended to be a lengthy exposition of the treatment of the numerous varieties of orchids, but merely to offer a few hints to those amateurs who have taste and facilities for their culture in a small degree. For those who wish to grow them extensively there are works devoted exclusively to this subject, which will supply all necessary information in detail.

Orchids, except in their natural habitat, usually require protection, either from the excessive dryness of the hot weather or the great radiation at night during the cold months.

In Bengal Proper, the betel houses answer better than glass houses, and the latter would probably be more suited to the North-West Provinces. Orchids may be described as terrestrial and epiphytic, or parasitic. The first named are usually grown in shallow pans containing a mixture of earth, leaf-mould, and broken brick, or they may be placed in a bed properly prepared and shaded. Some of these, when grown in pots, appear to thrive best when planted in charcoal and broken brick or kunkur, the pieces being broken and adapted to the size of the plants. Terrestrial orchids that appear sickly when in a mixture of drainage materials and earth should be re-potted without the earth; they will then frequently recover and grow vigorously. Charcoal and broken brick only must be supplied to such of the epiphytal varieties grown in pots. Some species thrive best when attached to trunks of trees or stumps of the same, and they are usually bound on with copper wire. They will benefit by the protection of moss over their roots in the hot weather. This will not be required in the rainy season. One of the prettiest and most effective methods of growing most of

these kinds of orchids is by suspending them in a rustic basket of wood: these are of various designs, and shallow. The sides, if open, must be lined with moss or cocoanut fibre before filling it with potting material. Orchids are greatly benefited by washing, and the method recommended for other pot plants answers for them also, tepid water, soap, and a piece of sponge with a light hand to use it, being all that is requisite. The ordinary season for re-potting all orchids is as soon as the flowers fade and before the new growth commences. When growing freely, give a plentiful supply of water, withholding it during their season of rest, unless it is an evergreen variety which requires a moderate quantity. The season of rest is from November to January or February, at the end of which most kinds will be coming into flower, and will then require water, moderately only, after the buds have set, until the blossoming is over, when a plentiful supply is needed twice a day. If the orchids are in a house, the floor at this time should be kept damp to create a steamy atmosphere. This may be safely done at any other time after a very hot day, even when giving water to the plants would be injurious. Orchids may be propagated by seed, or by hybridisation, and it is thus that many new and beautiful varieties are obtained. To raise seedlings, great experience is necessary, and care possibly more than amateurs would feel disposed to bestow. Many orchids are propagated by division, such as the *Angrocum*, *Vandas*, *Renanthera*, *Aerides*, and *Camarotis*. These throw up numerous young shoots round the parent stem, and these may be removed. The top of the plant of some may also be cut off just below the first root. These should be placed in moss or cocoanut fibre until they have fairly started. Many of the *Dendrobiums* are readily propagated by removing the old pseudo bulbs from the plants after flowering, just as they are beginning to grow, or during their season of rest. Use a sharp knife and do not injure the roots, and be sure that the part to be cut has some roots.

upon it. Pot them and give no water until they have started. *Cælogyne*, *Cattleya*, *Epidendrum*, and *Stanhopeas*, and many others, may be increased by cutting into pieces; an old stem with a young bud attached to each, as well as a few roots. Those orchids that only produce a single series of pseudo bulbs should be divided, but not removed until the cut pieces have formed bulbs, when they should be placed in separate pots. Mr. Williams, in the *Orchid Grower's Manual*, gives the same directions when large specimens are wished for. Some propagate themselves naturally, by forming buds in the axils of their leaves; these can be removed and potted as soon as the new plants have formed leaves.

*Ferns and Fern Cases.*

The culture of ferns is now becoming a favorite pursuit in India, and the beauty of a good collection affords a constant pleasure and refreshment. If placed in a suitable situation they may, with proper treatment, be grown successfully even in hot, dry stations. In the first instance it is but little trouble or expense to procure them, as they may, during their season of rest, be sent in a packet or letter from Europe, and at any time from their native habitat in the hills or elsewhere. The Maidenhair Fern and some small mosses are found in the interstices of the stones and bricks forming the sides of old wells, in several places in the Central Provinces. At Goonah, ferns abound; a small palm-leaved fern grows in the crevices of old walls about Agra, while around Calcutta, many varieties are found.

*Situation.*—Ferns love a shady and moist situation, and should be screened from the mid-day sun either by a belt of trees or some artificial protection; the milder rays of early morning will benefit them, and if growing vigorously they bear some amount of sunshine. If in pots, they can, during the hottest months, be easily removed to a situation facing the North, or to the shelter of a betel-house.

If planted in a permanent Fernery, it will be well in any case to avoid a South aspect. A very charming Fernery may be made, in a quiet nook shaded by trees, by throwing up the earth in banks and irregular elevations, making the trench wide and of a varied form. If faced with stone, and a pile of rock be introduced, a natural home will be thus provided for many ferns which love such situations, not forgetting to fill between and beneath the stone with proper soil. A rustic seat may appropriately be placed near. Many plants harmonize well with the ferns; some of the nobler species of grasses, and the graceful bamboo, with here and there a brilliant flower, will add to the beauty of the whole. For this purpose many of the lovely alpine plants are suitable, also bulbs, either planted permanently or sunk in the pots in which they are grown. The foreground and walk approaching should be green turf, or any mossy carpetting. If water is introduced, all must be in accordance with the scene, and it may be made to flow through and over the rockery, by the simple contrivance recommended in a former Chapter. A classical fountain or vase would be out of place, and so would many flowers which do not grow naturally in such a scene. An artificial screen may, in the absence of trees, be formed by training climbers or leafy trailing plants over a frame of trellis-work, thus shading the ferns from the blaze of the noontide sun, but plenty of LIGHT must be admitted.

*Soil.*—The selection of the soil for ferns is a matter of great importance, and if ordinary earth is put into the fern pots, they will not flourish. The best is a mould, with one-fourth part of silver sand, will answer well. If procurable, a dry fibrous peat containing a large amount of silica is the best soil. If the soil is mellow, and wanting in silicious grit, sand must be added, and mixed with the earth broken very fine. An excellent preparation for growing ferns is composed of equal proportions of very fine cocoanut fibre refuse, silver sand, pulverized charcoal, and good loam; or very finely pounded



brick or flower pot loam and silver sand. In coconut fibre alone, the ferns grow surprisingly, but appear to be far less robust than in the mixture recommended above.

*Fern Cases.*—A fern case for the adornment of the verandah may be constructed by a clever carpenter from the following directions:

A wooden box should be made eight to ten inches deep, from three to four feet in length, and from twenty to twenty-four inches wide. It is well *first* to procure the glass for the shade, as in many stations glass of large size is difficult to obtain, and the box may be ordered of the dimensions to fit the sheets of glass. This box must stand either on legs fitted into it, or have a small separate stand or table for its support. If the legs form part of the stand itself, they ought to be provided with castors, as being heavy, it is awkward to move. A lining of zinc is necessary, also a beading of wood round the edge of the box to prevent the glass top slipping off. As glass large enough for an entire side is seldom to be met with, it is best to have *one* large pane of glass for each end, and *two* for each side and the top. A frame of wood, about an inch wide, is to be made for the glass to fit into, a slip of wood also going down the middle of the top and sides for the same purpose. The whole of the wood-work should be polished, both of box and frame. The two ends and one side must be stationary, the top fitted with hinges, that it may be raised for ventilation, and the front side must open from the centre with double doors of glass. The whole frame being separate from, and resting on, the box. Place in the box charcoal for two or three inches, the larger pieces first, and the finer portions at the top. Then fill to within half an inch of the edge with the soil prepared for ferns, water the earth, and when it has settled down plant the ferns. A group in the centre and at each corner will look well, and ivy grows freely, and forms a screen over part of the case, if planted near the sides. Some pieces of rock

covered with moss may be introduced and the smaller ferns planted among them, but by tasteful arrangement as to size this is not necessary, and adds greatly to the weight. All being firmly planted, cover the surface with a pretty *growing* moss and the beautiful Lycopodiums. The ferns must be kept moist, but far removed from wet, and, excepting in, very dry weather, do not require water every day. A sprinkling with a syringe or rather large brush will refresh the moss, which in these fern cases grows quickly and luxuriantly. A fern stand may also be made of strong basket-work and painted brown, with a zinc lining, and the glass fixed in a frame of wood or of brass. A good sized glass shade, placed over a zinc lined box or basket, or an earthenware, or terracotta vase, will answer for a small collection. In the larger cases a small basket may be suspended from the top and contain a few small ferns planted in damp cocoanut fibre and moss. The little basket should be of wicker and covered with moss, which sown on fresh and green will remain so for a long time. In these cases it is easy to raise choice ferns from seed by filling a rather deep flower pot saucer with broken brick, charcoal, or mossy bits of stone, and scattering the seed over this, covering all with a glass shade or large tumbler, and keeping moist. The little plants may be removed with the bits of stone on which they grow. A small conservatory or glass-house, built on to the verandah or house, forms a charming home for ferns and many other plants, and will prove a source of unfailing interest and pleasure to those who do not object to the cost of such an erection.

## THE TEA-BUG OF ASSAM.

By S. E. PEAL, Esq.

As the tea-bug will no doubt soon be a subject of serious attention to all interested in tea, I send you all I know on the matter.

For some years now I have carefully watched it, and drew Mr. Wood-Mason's attention to it, when boxes of insects went to him last year and the year before,—many specimens in spirits ; and also, I think, drawings went.

There can be no doubt that this insect will be the future tea planter's great enemy, if it does not seriously cripple the industry ; and those who are already indulging in dreams of thirty and forty per cent., will soon be roused up when they find their profits reduced to three or four.

I have no hesitation in saying that this bug blight is steadily on the increase, and can affect the crop to fully 40 per cent., when bad ; gardens otherwise quite capable of yielding 1,000 maunds, say, reduced to 7 or 800.

Most other kinds of blight affect either the entire tree, one here and there, or if they injure the leaf, mainly attack that which is old and to us useless ; as the red spider for instance, which is never found on young soft leaf.

The white blister blight affects young leaf, but to nothing like the extent to which this bug does. In fact, the latter is more serious than all the other blights, white-ants, &c., put together ; and unless planters and proprietors look to this matter carefully and quickly, a future may be in store for all that will be both unexpected and unpleasant. I do not assert that tea is doomed as a profitable industry, but that as far as I can see, there is reasonable ground for alarm as to the future, and necessity for instant investigation. A year or two ago I sent a short notice about this to the *Bengal Times*, and it appeared. Lately, I again sent another to the *Englishman*, but whether it appeared or no, I cannot say, and I

have endeavoured in several ways to arouse attention to the matter.

Hitherto I have been mainly trying to get the plain fact recognized that this blight is a bug; it is now, however, asserting itself pretty lustily, and my recent efforts have been mainly to counteract the spread of false ideas as to the cause of the blight. It was long ere any one would concede that it was a bug, and it is denied to this day by many who are suffering from it. I, however, took means to prove the fact indisputably, which is not difficult, and always conclusive, when I get the chance.

Among those who admit it is this insect, various causes are assigned about as various, as among those who deny it is caused this way.

Some say too much shade, others, want of cultivation, *i. e.* jungle, some assign one cause, some another, and all equally wide of the mark, *I am in a position to prove it cannot be either "shade" or "want of cultivation;"* for in the two worst cases I know of, one was where the garden is particularly open, and the other was where the garden was quite clean, in May. One asserts this and another that, as is usual in all such new cases, but the fact is, it all lies far deeper. *We have largely propagated and collected in dense patches a particular shrub; and as every animal and plant has its special enemies, only too glad to develop when a chance offers, the Tea-bug rapidly extends on the new feeding grounds we open, and simply fulfils his destiny in so doing.*

The conditions for unlimited nourishment being at hand, it simply propagates, *ad libitum*. I have no doubt but that it lives on the juice of other trees or shrubs, though finding tea so plentiful, it prefers to remain near a garden, or on it.

The cause, therefore, of the bug appearing is simply that we offer to the tea plant's enemies unlimited chances of propagation; by collecting the shrubs into dense masses and encouraging the growth of THE YOUNG LEAF on which ALONE it

feeds—we directly encourage its increase.

The fact that the conditions most favourable for the growth of tea are also those most favourable for the development and maintenance of this blight is not a pleasant one. The more we extend tea, the more firmly we fix our special enemy in his new habitat; and from feeding alone on the juice of the tenderest leaves, it lives and grows at our direct loss.

So much for the actual fact of the blight being a bug; and also for the various so-called "causes" that induce its presence,—and now for a better description of the blight itself.

In the case of a garden badly affected, the most cursory glance at the first bush or two will decide if it is tea bug or not.

The general view of the tea is that the shoots are all brown, withered, and in fact dead, and the tea presents a generally brown look instead of the bright healthy green that is usual.

On examining a tree so affected, if the blight has only recently affected it, the appearance is very different from that of a tree which has suffered some time: in the former case the general growth and the look is normal, but, the youngest shoots and tips are more or less spotted with brown, the size of the spots varying with the age of the insect. If the bug is very young the punctures are close and minute, and the discolorations coalescent; but if it is full grown, the spots are larger, say an eighth of an inch diameter. Again, if the punctures are recent, the color is pale brown and darkest at the edges; but if one or two or more days old, the spots are dark brown verging on black, the entire leaf curling up and withering completely if they are close.

In the case of a tree that has suffered some time and severely, the symptoms are often less visible at first glance; the dead leaves have mostly fallen off and the minute shoots at the leaf axils alone shew the damage, and all are dry and

*Young Leaf recently punctured by Tea Bug.*

No. 7.



By young insect.

No. 8.



Middle aged.

No. 9.



and old.

No. 10.

FROM NATURE.





No. 14.

FROM NATURE.

Healthy shoot *recently* punctured; youngest leaves most, and shewing no dwarfed growth due to previous blight.







No. 12.

This is a good sample of where the blight attacked a shoot and after the growth was arrested, it again recovered, though only for a short time, and ~~was~~ again blighted.

The leaf A shews no blight at all. Leaf B when young, was attacked, and is injured; and the tip (at that time) C was killed. The two shoots 1 and 2 then grew out, but ere fully developed, were attacked, the youngest leaf suffering most; and the shoot of No. 1 being dead, while that of No. 2 is not. The above shews the *branchings* caused by blight.





No. 13.

Leaves and tips that are quite dead and dry.





No. 14.

FROM NATURE.

This branch has not been plucked even once, and shews how successive attempts to grow have been thwarted, as all the "tips" are killed, as they appear. Explanation of Diagram see overleaf.



dead, there is less dead leaf shewing, and in its place we find dead "tips" everywhere.

A more careful study will often shew a still more unpleasant fact, i. e., that ere it ceased entirely to shoot out, the tree had made many efforts to grow, all of which had been rendered abortive; and a branch that has not yielded us one single leaf or tip, will present all the appearance of having been very severely and persistently plucked.

On the tips of the young vigorous shoot being punctured, it has died as certainly as if nipped off, and the eyes below in the leaf axils shoot out vigorously; and ere the bug can do serious damage, one or two shoots have attained some size and carry several leaves; but as the insects increase in size, these tips again are attacked, and other shoots start from other eyes, though attaining a less vigorous growth and in a short time we have a regular "broom" where not on leaf or tip has been taken by us, but has been killed off or sucked dry by the bug alone, drawings of such I send herewith to illustrate.\* When this is the case, growth will have come to a complete stand-still, as every shoot requires from say 40 to 50 days to mature from an eye to be fit to pluck. We may say the trees shut up for about two entire months at least; and it is specially unfortunate, that this takes place usually about mid-season, and when we should be doing our very best. I do not state that the entire garden is thus affected at once, or we should soon see tea itself at a stand-still, but that the particular patches and trees most blighted do so as before stated; it is difficult to tell what part will be attacked this year or next, all places seem pretty equally liable to blight, and, unless very bad indeed, it is seldom seen, as yet, over an entire garden at once; but that this will be the normal state, eventually, I do not doubt. *The recovery of the tea is slow, unless pruned*, and then the cure is about as bad as

\* See No. 14.



the disease, as far as our out-turn of crop is concerned. While alluding to recovery, I may as well say that I *think no cure by us is possible, neither is prevention*. It will not pay to try to kill them by hand, (though some I hear are trying it.) We might just as well try to kill all the mosquitoes in this world by offering pice for every five or ten.

Each bush has from ten to twenty if only moderately bad; and when very bad indeed, I have seen fully thirty or forty rise out of a bush, and fly off, if the bush is shaken. This not on one bush alone, but on any one on a patch of fifty acres, planted 6' x 3', and where there must have been many millions of *mature*, let alone the immature ones and eggs.

To attempt syringings with any kind of decoction or preparation is at the very outset absurd in a climate where every tree is so *thoroughly washed* and cleansed by rain about every twenty-four hours.

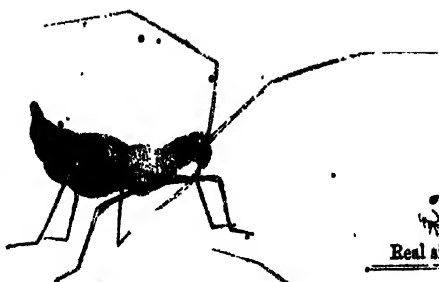
Poisonous fumigations seem the cheapest, if it were possible, but I know of nothing that will produce the required result so far.

To those used to charcoal burning, it is obvious how easy this mode of application would be, as the steam from pit to windward, often floats over an entire garden, at but few feet from the ground. I have searched in vain for cures, and the Natives say that when "Gandhi" attacks the paddy, (*i. e.*, the paddy bug) nothing can save the crop.

It is unfortunate, as I say, that this bug is a direct competitor with us for *young* leaf—that it lives on the juice that actually makes "*tea*," and that the conditions most favourable for us are also ditto for them.

I see no cure till Nature produces her own, in good time; and one is certain to come in the end, though probably not under twenty to fifty years.

In the struggle for life everywhere, the moment there is a footing something lays hold of it. As soon as a particular shrub is grown to a large extent, its enemy rapidly



Magnified.

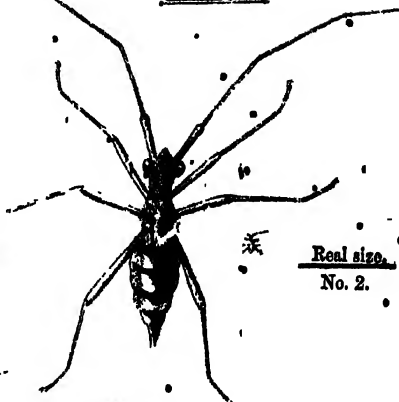
No. 1.



Real sizes.  
No. 1.

Very young one highly-magnified.

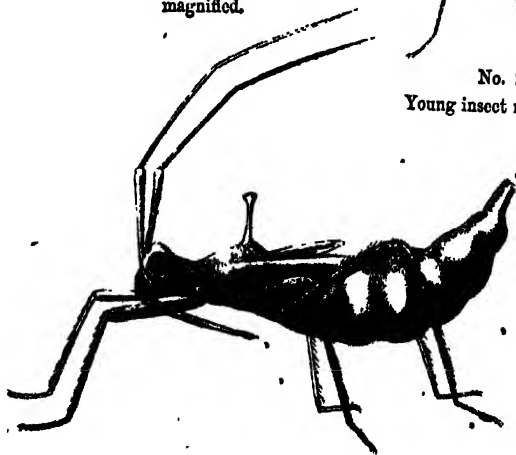
Real size.



Real size.  
No. 2.

No. 2.

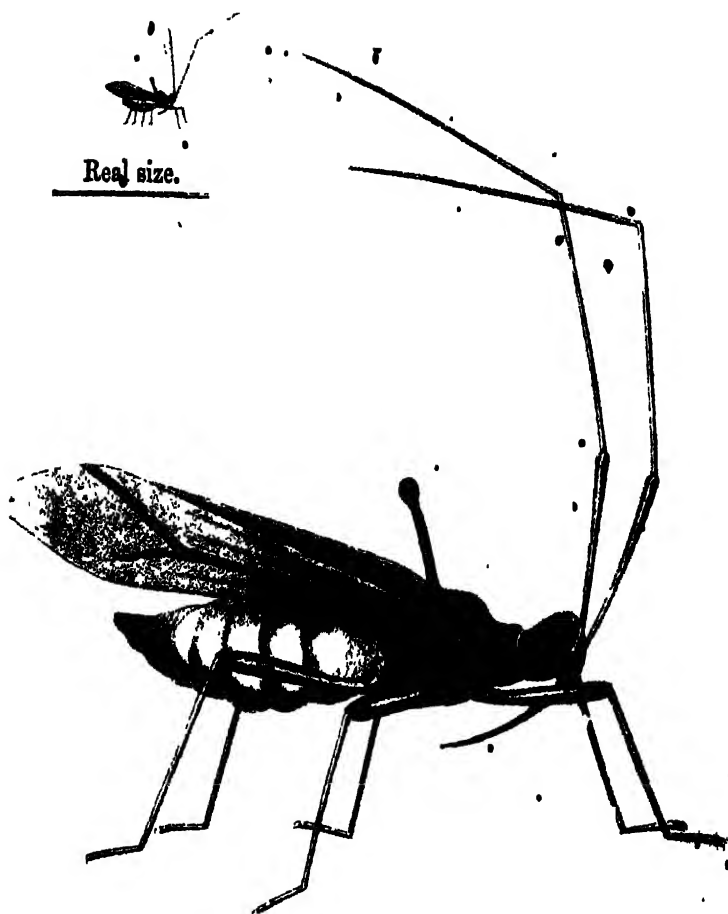
Young insect magnified.



Real size.

Half grown, (magnified.) No. 4.





Full grown and winged No. 5.

**MAGNIFIED.**

When old, the orange on thorax changes gradually to black.



developes; but as this enemy has in turn one that preys on it, the increase will thus encourage it in its turn, and keep our enemy in bounds. To exterminate the tea bug is impossible; and to attempt to cope with it, little short of absurd. The presence of this pest, will, however, probably direct tea into a new path, wherein reduction on expenditure to a large amount may be possible, so as to render profit more probable.

I have seen this pest now under all sorts of conditions: high land and low, dry or wet, rich or poor, with a dry season as bad as a wet one. Quite as bad with good culture and clean tea as when the reverse (indeed, more often in clean tea than not.) It seems as likely to come in open as under shade.

I shall be happy to answer any questions that may be suggested regarding this blight, and having studied it pretty carefully some years, may possibly help some solution of this difficulty in our path.

I have specially noted that it seems on the increase, and fear that it is; indeed, am certain of it.

This is probably the blight common this year and last in Cachar. Col. Money notices it at page 22, but does not know what it is, evidently. I will now endeavour to describe and draw the actual insect, and the way in which it affects the leaf.

When very young it is small, not, perhaps, when first seen more than a 16th of an inch long, and of a pale yellow color, due to the tea liquor.

As it increases in size, the color deepens, but it is semi-transparent until full grown, when it turns black on the head and thorax and white on the abdomen, and 2 pair of wings are developed. A long pair of antennae are present always. The young, like No. 1, seem present at all periods from April to November. There is no set breeding time, or broods.

*Memo. to Diagram.*

• A to B was the original stem, no doubt once much straighter: on this were the leaves 1, 2, and 3 and the "tip" 4.

When the latter was punctured and killed, the eyes, in the axles of leaves 1 and 2, grew out as shoots C and D; the latter was arrested soon, but C was developed until nearly same size as A B.

In turn C was attacked and the tip 8 killed, when no doubt 5, 6, and 7 started; and when the first one, *i. e.* 5, had grown somewhat, the tip 12 was in turn killed and caused the eyes at 9, 10, 11 to shoot, the former, *i. e.*, 9, or lowest, (as in case of 5) again grew most and was in turn killed at the "tip," and in this phase growth seems to have completely been stopped, as all the *most vigorous eyes* had "started" and been killed in succession.

It is noteworthy that the lowest shoot on each branch is the most vigorous.

Out of the axles of leaves 1 and 2, No. 1 has the most vigorous of the two shoots C and D.

Again, on the branch C, the lowest eye has the most vigorous shoot, 5, on which again the strongest shoot is lowest, as 9.









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VOL. IV.  
PART I.—JANUARY TO DECEMBER, 1872.  
CORRESPONDENCE AND SELECTIONS.

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1873.







T. Black & Co. Lith.

Branching Date Palm at Indore.

LIST OF MEMBERS  
OF THE  
Agricultural and Horticultural Society

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INDIA.

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DECEMBER 31<sup>st</sup>, 1872.

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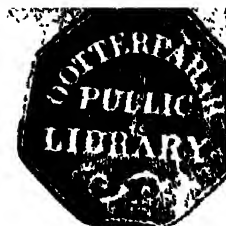
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ORIGINAL COMMUNICATIONS

\* A body of men engaged in the same pursuit form a joint stock of often information and experience and thereby put every individual in possession of the sum total acquired by them all. —REV. DR. WILLIAM CARPIS.

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---

*Notes on the Propagation of Plants by Leaves.* By T. M.  
FRANCIS, ESQ.

THERE are few operations in gardening which afford more pleasure than this mode of propagating plants. Seeds but too often fail to germinate; it is impracticable to raise more than one plant from a cutting; and in cases where it is desired to obtain specimens of a rare and choice plant, it is often a matter of considerable difficulty to procure them, or even to obtain cuttings from which they may be raised. The owner of a rare or valuable plant is naturally unwilling to part with it, or to spoil its appearance by allowing his friends to take cuttings from it; whereas if he were asked to give away a single leaf, he would in most cases readily do so. Again, leaves may be sent by post to almost any part of India, much more cheaply and speedily than plants could be despatched in a Wardian case; and if proper care be taken, they are sure to arrive in good condition. By the several modes of treatment which I am about to describe, it is always possible to raise at least one plant from a single leaf; and in many cases eight or nine plants may thus be raised.

VOL. 4, PART II., NEW SERIES.



• Propagation by leaves, though not practised in India as commonly as it deserves, has been known and practised in Europe for more than two centuries. It is said to be the invention of Friedrich, a celebrated gardener at Augsburg, and to have been first described by Mirandola, in his "*Manuale di Giardinieri*," published in 1652. (Loudon's *Horticulturalist*, p. 228.) In the beginning of the last century, Richard Bradley, F. R. S., published a translation from the Dutch of Agricola, of a book upon the propagation of plants by leaves. Judging from a paper which was published in the Society's Journal, vol. VI., p. 145, it appears probable that this work was founded on some successful experiments made by Von Mürchhausen in the propagation of lemon trees by single leaves. Unhappily, Agricola gave the reins to his imagination, and asserted that by the aid of a mastic which he had invented, the leaves of any plant, dipped at the stalk end into this preparation, would immediately strike root; and the book was adorned with copper-plates exhibiting both the process and its result, in the form of fields stuck full of orange leaves growing into trees: (Lindley's *Theory of Horticulture*, p. 199.)

It is not improbable that the glowing account given by Agricola led many persons to try the mode of propagation described by him, and that the failure of these experiments caused them to reject the substratum of truth on which his work was founded. By degrees, however, it became generally known that some leaves were capable of multiplying their species; and further experiments were therefore made. In 1809 the Hon. and Rev. W. Herbert succeeded in raising bulbs from a leaf of *Ornithogalum*. He says, "The leaf was cut off just below the surface of the earth in an early stage of its growth, before the flower-stalk had begun to rise; and it was set in the earth near the edge of the pot in which the mother plant was growing, and so left to its fate. The leaf continued quite fresh; and on examination (while the bulb was flowering) a number of young bulbs and radical fibres were

found adhering to it. They appeared to have been formed by the return of the sap which had nourished the leaf. Thereupon two or three more leaves were taken off and placed in like situations, but they turned yellow, and died without producing any bulbs. It appeared to me then, and it was confirmed by subsequent experience, that in order to obtain a satisfactory result *the leaf must be taken off while the plant is advancing in its growth.* I found it easy thus to multiply some bulbs that did not willingly produce offsets."

It will be observed that the first leaf was put down while the parent plant was in full vigour, and before the flower-stalk has begun to rise; while the other leaves were not put down until the plant was flowering, which necessarily deprived them of a certain amount of nourishment.

Other experiments on bulbous plants which were tried by the same gentleman are thus detailed: "I afterwards tried, without cutting the leaf off, to make an oblique incision in it under ground, and in some cases just above ground, attempting, in fact, to raise bulbs by layering the leaf. This attempt was also successful, and some young bulbs were formed on the edge of the cut above ground as well as below. I tried cuttings of the stems of some species of *Lilium*, and obtained bulbs at the axil of the leaf, as well as from the scales of the bulb; and that practice has since been much resorted to by gardeners, though I believe it originated with me. I raised a great number of the bulbs of the little plant which has been successively called *Massonia*, *Scilla*, and *Hyacinthus corymbosus*, by setting a pot full of its leaves and placing a bell glass over them for a short time. A bulb was obtained with equal facility from a leaf of a rare species of *Bucomia*; and experiments with the leaves of *Lachenalia* were equally successful. I apprehend that all liliaceous bulbs may thus be propagated; but the more fleshy the leaf, the more easily the object may be attained." (*Gardener's Chronicle* for 1841, p. 381.)

Hedwig found the leaves of the Crown Imperial, put into a

plant-press, produce bulbs from their surface (Lindley, p. 199.) It was also discovered that *Roekea falcata* was capable of producing adventitious buds from the upper side of its leaves. (DeCandolle's *Physiologie Végétale*, Vol. II., p. 672.) One of the commonest instances of leaves which multiply their species is afforded by *Bryophyllum calycinum*. This plant grows wild in the West Indies (where it is commonly called the Devil-Plant) and is often found in the outskirts of Calcutta and Howrah. Many years ago, it was discovered that if a leaf of this plant were laid on the earth, it would produce young plants along its margin, at the extremities of the primary veins. Even if a leaf is detached from the stem and hung up in some shady and moist place (*e. g.*, a bathroom) it will soon produce young plants. Plate I. shows the mode in which a single leaf of this plant propagates its species.

These experiments and discoveries only tended to show that plants might be raised from an entire leaf; but it was soon discovered that even part of a leaf would produce the same effect. M. Turpin found that floating fragments of watercress leaves, cut by a species of *Phryganea* for its nest, produced from their base, and below the common petiole, at first two or three colourless roots, then in their centre a small conical green bud, from which arose all the aerial parts of a new watercress plant, while the roots multiplied and lengthened. (*Comptes Rendus*, 1839, sem. II., p. 138.) M. Flourens states that the leaves of purslane, divided into three, produced as many new plants, each having a root, stem, and leaves. (Lindley, p. 200.) In 1839, M. Neuman, of the Jardin des Plantes, Paris, tried an experiment with the leaves of *Theophrasta latifolia* (*Clavija ornata*, D. Don.) He cut a leaf in two, and planted both parts in the same pot, treating them exactly alike. In about three months, the lower half of the leaf had made roots, but the upper half had none; though some time afterwards, when it became necessary to separate the cuttings, M. Neuman found that the upper part of the



Plate I



Plate II



leaf had also made roots, though these were much shorter than those of the lower half. The rooting of two halves of a leaf of the *Theophrasta*, which is known to be hard and dry, appearing to him an interesting circumstance, he continued to pay attention to them for six months. At last in the seventh month, for the first time, he saw, at the extremity of his two half leaves, buds appearing; and in June 1810, these two cuttings had become beautiful and healthy plants. (Loudon, p. 228.)

Notwithstanding the success of these experiments, and of others which I have not thought it necessary to mention, the propagation of plants by single leaves was for a long time regarded as a lottery in which the blanks were far more numerous than the prizes. After noticing most of the experiments to which I have referred Lindley says, (p. 202) "Leaves, however have not been often employed as the means of propagating a species; and it is probable that most leaves, when separated from their parent, are incapable of doing so, for reasons which we are not as yet able to explain." Similar opinions have been expressed by Glenny (*Hand-book of Practical Gardening*, p. 230) and by other eminent horticulturalists. But later experiments have shown that there is probably no class of plants which might not be propagated by leaves. This mode of propagation has been tried successfully with cryptogamous plants, with endogens and exogens, with the popular divisions of ligneous and herbaceous plants, annuals, biennials, and perennials, and with the leaves of bulbous plants and palms, (Loudon p. 228.)

A very interesting series of papers on this subject will be found in the *Gardener's Chronicle* for 1845. As they have already been reprinted in the *Society's Journal* (Vol. V., p. 192) I forbear from setting them out in extenso. There is, however, an account of a most interesting experiment tried by Mr. Reid, of Noblethorpe, which I venture to transcribe. He says, "Last spring I put in a few cuttings of fuchsias under

a bell-glass; on taking them up for potting, I found among the sand two leaves that had dropped from the cuttings, and got imbedded in the sand about half their length, caused by occasionally taking off the glass to water the cuttings; to the petiole of each leaf was attached several fine fibres, nearly half an inch long. I carefully replaced them in the sand, and put the glass over them, and in a few weeks they both produced shoots, and are now good strong plants; the variety was *Money-pennyii*, a particularly thin-leaved sort."

The peculiarity of this case lies in the fact that instead of the leaves being freshly severed from a healthy plant, they had dropped from cuttings. When this is the case, they usually contain little or no sap, and are completely exhausted. I will now proceed to give details of the apparatus required for leaf-propagation, and the principal modes in which it is practised.

Many leaves root freely without any protection from the external atmosphere, if they are merely kept in the shade; but it is always better to cover them with a bell-glass. Should this not be procurable, a very good substitute for it can be made by any native tinman. This consists of five panes of glass fixed into the tops and sides of a four-sided tin or zinc frame-work. The apertures between the panes of glass and the metal frame must be well closed up with putty, so that when the glass is inverted and filled with water, not a drop will escape. At least a week should be allowed to elapse before the glass is used, in order that it may be free from any smell of putty.

A broad shallow pan, such as is used for sowing seeds, is well adapted for leaf-propagation. It should be filled with silver sand and finely-powdered charcoal, well mixed together in equal proportions, and passed through a fine sieve. The antiseptic properties of charcoal are well known, and if well mixed with the sand, it will effectually prevent it from turning sour and thereby causing the leaves to rot.

Bottom-heat is not always essential, but is in most cases desirable, as it greatly facilitates the formation of a callos, and causes the leaf-bud to spring up much sooner than it would if the temperature were not raised. The mode of making a hot-bed is described in almost every work on gardening, and a concise description of it will be found in the Society's Journal, Vol. IV. (N. S.) p. 56. Those of my readers who may not wish to try leaf-propagation on a large scale can use hot water instead of a hot-bed, in the manner described at p. 54 of the same volume.

There are three modes of leaf-propagation which are generally practised. The first is to insert the stem of a leaf in sand and charcoal, or in sandy loam. By this means only one plant can be raised at a time; but if, when it has formed two or three leaves, the stem of the parent leaf be cut off just above the plant, it may be again inserted in the sand and charcoal, and another plant may in time be raised from it. This of course can only be done if the stem is sufficiently long to be thus treated.

The second mode is to make incisions in the principal veins of the leaf, and to lay it flat on the sand and charcoal. If this is properly done, a plant may be raised from the stem of the parent leaf, and from each incision in the veins. I have succeeded in raising fourteen plants from two leaves of *Peperonia marmorata*, treated in this manner. It is, however, necessary to take great pains to prevent the soil from becoming either too moist or too dry, as in the former case the leaf will rot, and in the latter it will dry up.

The third, and in many cases the most successful method, is to cut the parent leaf in pieces and insert them in sand and charcoal. By this method even those leaves which are comparatively hard and dry can each be made to yield two or three young plants; while from succulent leaves, as those of *Begonia*, *Peperonia*, *Gloxinia*, &c., a much greater number can be raised. At a recent meeting of the Society, I was



enabled to exhibit eight plants of *Begonia Rex*, springing from portions of a single leaf which had been treated in this manner; and since then two more plants have sprung from other pieces of the same leaf.

I will now endeavour to give some details regarding the three principal modes of leaf propagation.

1. By inserting the stem of a leaf.

This is the surest method of propagating plants from leaves which are naturally hard and dry. Take a leaf which is nearly full grown, with the stem entire. Insert the stem in sand and charcoal, burying it from a quarter to half an inch, or even more, according to the size of the leaf. Keep both the soil and the atmosphere uniformly moist, and at a higher temperature than is required for rooted plants of the same species. With glass and bottom-heat, every leaf thus treated ought to form a young plant. Exposure to the sun must be carefully avoided, as it is fatal to all but the most hardy leaves.

In course of time, a callus will form at the base of the leaf-stalk. From this roots are produced; and a bud is eventually formed, from which the young plant springs. (Plate 2.) It is impossible to say when this will take place, as the time varies according to the texture of the leaf. The leaves of *Begonias* and other succulent plants will produce roots and young plants in a very short time; while those of plants which are hard-wooded and difficult in propagation will take months, and even years, to produce the same result. On the 15th December, 1872, I put down six leaves of *Olea fragrans*; and up to the present time (January 1874) none of them have produced young plants, or even roots, though a large callus has formed at the base of each stem and the leaves look perfectly fresh. This backwardness is probably owing to the fact that the leaves have been frequently disturbed, the pot which contained them having on one occasion been upset, and its contents scattered. It may be laid down as an axiom that

no gardener should despair of raising plants from a single leaf, so long as it continues to look fresh.

The parent leaf must be left undisturbed until the young plant has formed three or four leaves, when it should be separated by cutting through the parent stem with a sharp pen-knife. This being done, the young plant should be carefully removed, so as not to injure the roots which it has formed. It should then be put into a pot by itself, care being taken that the soil which is in contact with the roots is of the same nature as that in which they were originally emitted. When this is done, it is advisable to cover the plant with a bell-glass, and if bottom-heat has been used, to continue using it until the young plant is thoroughly established in its new habitation.

The parent leaf may be put down again, as already mentioned, if the remaining portion of its stem is sufficiently long to admit of this being done. If not, it may be cut into two or more pieces, and treated according to the third method.

2. By laying the leaf flat, having previously made incisions in its principal veins.

This mode is best adapted for plants with succulent leaves, as *Begonia*, *Peperomia*, &c. It has, however, been successfully practised with comparatively dry leaves, though these require much more care. At p. 32, Vol. IV. (N. S.) of the Society's Journal will be found an interesting account of the experiment tried by Mr. C. E. Price, in raising plants from a single leaf of *Fittonia Verschaffeltii*, pressed down on silver sand under a bell-glass. At the time when this account was written, Mr. Price had only raised a single plant; but he subsequently obtained several other plants from the same leaf.

The *modus operandi* is as follows: Select a healthy leaf, nearly full grown. Provide a stock of thin slips of bamboo, sufficiently long to project at least a quarter of an inch beyond each side of the leaf, when laid across it at right angles to its mid-rib. Procure a few feet of galvanized iron wire, about as

thick as an ordinary hair-pin, and cut it up into lengths of five inches. Bend each of these into the form of a hair-pin.

Now cut the leaf away from the plant on which it grew, leaving (if possible) at least two inches of stem. Having done this, make incisions through the principal veins of the leaf, cutting a very small portion of the vein clean away. The number and size of the incisions of course depend upon the size of the leaf.

When the leaf has been prepared as above stated, lay it flat on the sand and charcoal, burying the stem about a quarter of an inch below the surface. If the conformation of the leaf prevents it from lying flat, a few cuts through those parts which are either convex or concave will remedy the defect.

Having laid the leaf flat on the surface intended to receive it, place the slips of bamboo across it at right angles with the mid-rib, taking care that they do not come so near the incisions as to prevent the young plants from springing up. Now peg down the ends of each slip with the galvanized iron wire, but see that the latter does not come into contact with the leaf. If the wire cannot be procured, bend slips of bamboo into the form of three sides of a square, and peg the leaf down with them. Plate 3 represents a leaf of *Peperomia marmorata*, cut and pegged down in the manner above described.

Cover the leaf with a bell-glass, so as to exclude the external air. An occasional sprinkling of water outside the bell-glass will supply the leaf with as much moisture as it requires.

In due time a callus will form at the end of the leaf-stalk, and a young plant will spring up in the manner already described. This will before long be followed by other plants, springing from each incision in the veins. When each plant has formed three leaves, remove it carefully, and prick it out as before directed.

3. By inserting pieces of the parent leaf in sand and charcoal.

This is the most successful method, as it may be adopted

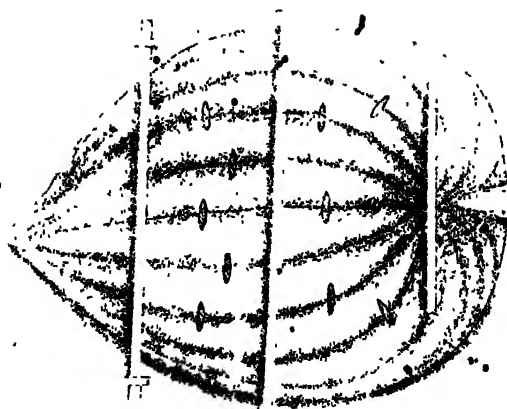


Plate I.

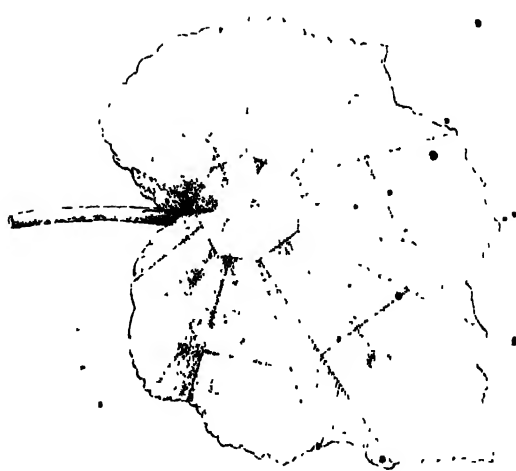


Plate IV



both with succulent leaves and with those which are naturally hard and dry. In dealing with the latter, it is advisable to cut the leaf into halves, or at most into thirds, raising young plants from portions of the mid-rib alone; but all the principal veins of a succulent leaf will serve for the reproduction of plants. Plate 4 shows the mode in which a leaf of *Begonia* should be cut up for this purpose. The dotted lines indicate the cuts which should be made, and those portions which are shaded should be thrown aside. First insert the stem in sand and charcoal, in the same way as that described for dealing with an entire leaf, and then insert the portions into which the leaf has been divided, placing them at an angle of forty-five degrees with the surface of the soil, and just deep enough to enable them to stand firmly. They must not be placed at a less distance than an inch and a half, or even two inches from one another, as it is essential that each portion should have plenty of light. When I first tried this mode of propagation, I dibbled in the bits of leaf close together, and they died off with all speed.

If the above directions have been duly observed, it will soon be found that the stem forms a callus, emits roots, and produces a young plant. Those portions of the leaf in which the veins are thickest will before long follow suit, and in time every piece of the leaf will take root and form a plant.

In conclusion I will add a few rules which are equally applicable to each mode of propagation.

1. Always expose the upper surface to the light, and give the leaves as much light as possible, short of actual exposure to the sun.

2. Be careful not to give either too much or too little water, and to preserve an even temperature.

3. If in the plains, do not commence operations until the beginning of the cold weather. In the hills, it will probably be advisable to commence putting down the leaves in March or April.

4. Above all, be patient. Do not give up in despair if your first attempts fail, but try again and again, and you will be sure to succeed sooner or later. I have recounted a few of my successes; but the failures which preceded them might be numbered by scores.

*Notes upon Garden-Roses in India. By Rev. T. A. C. FERMINGER, Honorary Member.*

ON meeting lately with Part I., Vol. II. of the new series of the Journal of the Agricultural and Horticultural Society, I found an article by Mr. J. B. Stirling, entitled "Remarks on culture and description of Roses in the collection of the Royal Botanical Gardens, Calcutta," which commences thus: "The confusion arising from local nomenclature, and the absence of a list suited to the wants of a numerous class of Rosarians, has hitherto been much felt in the Lower Provinces of Bengal." Now while at the same time I cannot admit that there was the amount of confusion Mr. Stirling speaks of, it appears to me that he has introduced several errors himself, which it would not be well to let pass unnoticed. In undertaking to correct these errors, it occurred to me likewise, that some few items of information, which I have been enabled to gather about the Rose, more especially in relation to its existence in India, might not be unacceptable.

I shall first then make my remarks upon what I have to object to in Mr. Stirling's paper: and then conclude with a few notes of my own.

## PART I.

I would first of all mention that the distinguishing of roses is by no means so simple an affair as many might take it to be. There are indeed very few, I find, even among the most

skilled gardeners, who know much more about roses than the general mode of cultivation suited to each group : and even professed rose-growers whose constant and sole occupation it is to cultivate them are often much perplexed when required to distinguish and identify them. As an instance, a week or two ago I took a rose from my garden, of which I had lost the name, to one of our principal rose-nurseries to have it named, and it was decided positively to be *Madame Alice Dureau*. With this name I was not satisfied, as I had never procured a rose so named for my garden. So shortly afterwards I took it to another rose-nursery of equal repute, where it was decided as positively to be *L'a Reine*. As the rose of this name likewise was not among those I had ever procured for my garden, I conclude that my second informant was as wrong as my first. And yet I have not a whit the less respect for the knowledge of these two rose-growers. The fact is, that out of the numberless varieties that keep coming into existence, there must of necessity be many, between which the most practised eye could discern no difference ; and a vast many more which a mere amateur or an ordinary observer would pronounce to be entirely alike. And this is a consideration I would impress upon those who are eager to procure new varieties from Europe. Pleased with the description they read of some new rose, they will be in all haste to obtain it ; and then find perhaps on its blooming, that there is little in it to tell it by from one they already possessed.

Some few of the roses established in the Calcutta gardens had, a short time ago, no doubt wrong names applied to them ; while some half dozen others perhaps, from their true names having become lost, had local names given them, most commonly the names of those who had introduced them. Before discussing those to which new names have been given by Mr. Stirling, I will just mention those which had had their proper names already determined.

These six roses, wrongly named before, were identified by



myself, and now bear their right names :

Léonie Verger.	Solfaterre.
Mrs. Bosanquet.	Elise Sauvage.
Devoniensis.	Julie Maquisais.

I may mention also that the rose now called Melior passed formerly in the Botanical Gardens as China Melori. This seemed to me a senseless name, misspelt, as I conceived, for Melior. I suggested this latter name for it to Mr. Robert Scott, but he replied, that he retained the name, with which it came labelled to him (from Mauritius, if I remember right) and was unwilling to change it. Its true name remains still doubtful. Booth's Rose, so called from the nurseryman, who supplied it to the Agricultural and Horticultural Society, was identified by Mr. R. Scott as Goubault; a difficult thing to do, by the way, considering the magnificent blossoms it puts forth in India compared with what it produces in England. I myself conceived it might be Bougère; but Mr Scott was probably right. The true Goubault is remarkable for exquisite perfume, making its presence known for a long distance around.

The rose likewise improperly called French White was identified by Mr. R. Scott as the Maid of Athens; a sweet rose, well deserving a place of honour in every Indian garden, though discarded by English nurserymen seemingly at the present time.

The rose La Reine was at one time by some misconception believed to be a seedling raised in the gardens of the Agricultural and Horticultural Society, and was named Lady Caning. I remember when it was identified by Mr. R. Scott, and Mr. Sharp of Barrackpore Park.

The above corrections having been long ago all duly made, there remained then, as it appears to me, no very material amount of error to set right. The only roses concerning which there could be much doubt are the following: 1, Bartlett's Rose and 2, Reine de Provence-rampant roses of little value,

not taken account of by Mr. Stirling and possibly not existent now in the Botanical Garden: 3, Wood's Rose, and 4, Peel's Rose, Tea-roses, (if the latter still exists under that name in Calcutta,) 5, Queen of the Reds, this last rose, Mr. R. Scott, from a plate, which he thought resembled it, conceived to be D'Aguesseau; and it has consequently I believe long borne that name in Calcutta. But D'Aguesseau belongs to the French or Gallica group, of which this rose has not the characteristics. I believed it to be a Bourbon, and retained to it its old appellation. Mr. Stirling however, following me, has classed it among the Bourbons, and at the same time following Mr. Scott, has given it a name that belongs only to one of the French roses.

I now come to notice the roses, which Mr. Stirling has rather changed the names of, or consigned to another group. He has in some instances done both. These are the ones, we may conclude, which he made especial reference, when he spoke of confusion in their nomenclature. They are the eight following:

- |                          |                             |
|--------------------------|-----------------------------|
| 1. Sir Walter Scott.     | 6. Souvenir d'un Ami.       |
| 2. Rose Edward.          | 7. Laurence de Montmorency. |
| 3. Madame Vidot.         |                             |
| 4. Rajah.                | 8. Canina Borboniana.       |
| 5. Jibbon Kissen Paul's. |                             |

1. *Sir Walter Scott*.—Mr. Stirling has changed the name of this to *Empereur de Maroc*, and from a *Noisette* made it a *Hybrid Perpetual*. It is a true *Noisette* notwithstanding; and moreover of the colour, of which Sir Walter Scott is described, namely rosy-lilac: while the *Empereur de Maroc* is one of the very darkest roses known, almost black. I may add too, that on visiting the Botanical Gardens in 1857, I saw quite a little wilderness of this rose growing there; whereas it was not till the year 1858 (according to M. Eugène Forney), that the *Empereur de Maroc* was produced at Angers. I have no reason to doubt but that Sir Walter Scott is the right

name of the rose that has for years been so called in Calcutta.

2. *Rose Edward*.—Mr. Stirling calls this “Jules Margottin.” I have now before me in my garden trees of Jules Margottin in full blossom, and I do not hesitate to say, it is hardly possible to imagine roses more dissimilar than these two. On my first arrival in India in 1846, I found the Rose Edward the commonest plant in all gardens throughout the country, whereas it was only in 1853, that the rose Jules Margottin was called into existence by the French rose-grower, whose name it bears. That Rose Edward is the right name of the rose, long so called in India, I shall endeavour to make evident when I speak of the Bourbon group further on.

3. *Madame Tilot*.—This rose Mr. Stirling has removed from the Hybrid Perpetuals, the group to which it truly belongs, and placed among the Teas. I have the best authority for saying that no Tea-rose under this name ever existed.

4. *Rajah*.—Mr. Stirling assigns to this rose the name of Jeanne d’Arc. I have now on the table before me a cluster of flowers of Jeanne d’Arc. They are pure white, of a close ball-like form, totally different from that of Rajah, and of not half the size. The Rajah moreover belongs to the tea-scented section of Noisettes, whereas Jeanne d’Arc does not. The true name of Rajah I am unable to say, but I lean much to the opinion that it must be Lamarque.

5. *Gibbon Kissen Paul’s Rose*.—To the rose, so called for distinction’s sake, I attached the name of the native gentleman from whom I received it. Comparing the very distinct recollection I have of it, as it blossomed in my garden at Chinsurah, with the Bourbon rose Armosa now blossoming in my garden here, I feel confident that it is the same rose. The description, moreover, I gave of the rose from observation in India corresponds with that given in the English catalogues of Armosa; namely that the flowers are “deep pink, of medium size, full; and that it is a constant bloomer.” Mr. Stirling has assigned to it the name Lady Warrender, a rose

described in the English catalogues as with "flowers pure white, large and full, form cupped." The rose to my conviction is unquestionably *Armosa*. I must however in candour admit that Baboo Jibbon Kissen Paul allowed me to see the invoice of the roses he procured from England, and that having preserved a copy of it, I find in it no mention of *Armosa*, while I do of *Lady Warrender*. But I attach less importance to this, as the Baboo assured me that the China rose Mrs. Bosanquet (not mentioned in the invoice) came to him labelled *Cynthia*, an old French rose, as utterly unlike in flower and character as any rose can be conceived to be.

6. *Souvenir d'un Ami*.—This Tea-rose Mr. Stirling states to be synonymous with *Princesse Hélène*. There is no Tea-rose *Princesse Hélène*; but a Hybrid Perpetual of that name is mentioned by Mr. W. Paul, as having been introduced in 1837, interesting from being "the first *striking* variety of that group that was obtained," there was also an old Tea-rose *Princesse Hélène du Luxembourg*, but quite distinct from *Souvenir d'un Ami*.

7. *Lawrence de Montmorency*.—This rose (identical seemingly with the one known in Calcutta as Pereira's No. 5, and belonging to the Damask Perpetual group) Mr. Stirling has classed among the Damasks. The Damask Perpetuals, I need hardly observe, are in fact, but a section of the Hybrid Perpetuals in which the Damask blood somewhat predominates. But *Lawrence de Montmorency*, as Mr. Rivers observes, partakes less of the Damask character than any of the group, and would in most catalogues find its place among the Hybrid Perpetuals. At any rate it is wrong to class it as a pure Damask. It is easy to propagate by cuttings, whereas it is the peculiarity of Damask roses, as well as of such hybrids, as owe much of their origin to them, that they are by no means easy to propagate in that way.

8. *Canina Borboniana*.—This Mr. Stirling has set down as *Madame Soëtman*, a Damask rose, with which it has no

resemblance or characteristic in common except that its foliage is of a yellow-green hue. After diligent inquiry I have as yet failed of recognising it among any of the roses I have seen in English gardens. Many in description seemed to come near it, but on inspection proved quite dissimilar. I thought that *Triomphe de Bolwyller* made the nearest approach to it, but this rose I have been unable to inspect, as it appears to have gone out of cultivation in English nurseries. I am therefore at a loss what name to assign it: but how at any rate it could have retained so many years the name *Cantina Borboniana*, which I shall show by-and-bye, could belong to no rose in existence, seems to me now a matter for perfect wonder.

## PART II.

What I have now to communicate about garden-roses in India, I shall find it most convenient to do by arranging them in their respective groups. These groups I separate, as suggested by M. Eugène Forney into two great divisions, which for brevity's sake I call Western Roses and Eastern Roses. But many of the roses we have also to consider will be hybrids or cross-breeds between those of these two divisions; and I may here just notice that the more or less any such hybrids derive from the one or other of the roses of these divisions, the more or less they will partake of the properties I have attributed to the roses of that division.

I. *Western Roses*.—These, though accounted natives of lands as far east as Syria, the Caucasus, and even Persia, may, compared with those indigenous to India and China, not inaptly take the title by which I propose to distinguish them. They comprise the Provence roses, the French or Provins Roses, the Damasks, the White, the Austrian Briar, and the Scotch, the sweet so-called summer roses of former times, and favourites of our early days, now rarely seen and all but discarded. As regards their cultivation, these three

peculiarities are to be noticed.

1.—They blossom but at one season in the year : and are deciduous.

2. They throw up rooted suckers.

3. They may be propagated by layers but not by cuttings.

II.—*Eastern Roses*.—These comprise the several varieties of China roses, Tea-roses, Bourbons, and Noisettes, as well as *R. odorata* and *R. moschata*. Their distinctive properties are:—

1. They continue in blossom more or less throughout the year : and are evergreens.

2. They throw up no suckers.

3. They are multiplied with little difficulty by cuttings as well as by layering.

*Climbing Roses*.—These are not included in the above two divisions ; but will be taken notice of further on.

## DIVISION I.—WESTERN ROSES.

### I.—*ROSA CENTIFOLIA* : PROVENCE ROSES.

It appears pretty well decided that the roses of this group are not natives of the part of France, of which they bear the name : and no writer I have consulted seems able to explain why this designation has been bestowed upon them. Dr. Lindley states the eastern slopes of the Caucasus to be the home of the original type. The group includes the several varieties of Cabbage and Moss Rose of different sizes and shades of colour from crimson to pure white. No rose of this group, as far as I can ascertain, has ever been brought to establish itself and thrive in Lower Bengal, nor as I believe in the plains of India at all. Roxburgh in his *Flora Indica* has, it is true specified *R. centifolia* : but it must be *R. damascena* he means, and which, with Linné, he considers not a distinct species, but only a variety of *R. centifolia*. This is evident, for otherwise *R. damascena*, which is no other than the Bassorah, so common everywhere, would cer-

tainly have been noticed by him. And I believe it is as *R. centifolia* that the Bussorah has always since been known in the Botanical Gardens. Mr. R. Scott I remember pointed it out to me under that name: and Mr. Stirling describes the two kinds of Bussorah as *Centifolia Red* and *Centifolia White*. Dr. Anderson likewise in his catalogue gives *R. centifolia*, but not *R. damascena*, comprehending no doubt the latter under the former. Dr. Voigt moreover in his catalogue has likewise given *R. centifolia*, but is manifestly the Rose Edward which he means for it; speaking of it as a large double rose, blossoming in February and the hot season; not taking into account that Provence roses blossom but one season only in the year. He gives also the native name Bussorah to it, which as is well known belongs to the attar-yielding rose, described as such by him under *R. damascena*. Thus he makes out the Cabbage Rose, the Bourbon Rose Edward, and the Bussorah to be all three one and the same. Taking then *R. centifolia* and *R. damascena* to be entirely distinct as in the gardener's eye at least, they decidedly are, I believe that neither the former nor any variety of it has become so far established as to thrive and blossom in Lower Bengal.

*The Moss Rose.*—This when it loses its mossiness, as it does occasionally, is recognised as being in every respect merely the common Cabbage Rose. In the Proceedings of the Agricultural and Horticultural Society of the Punjab, it is stated that red and white moss roses thrive in that part of India; and I was told by Mr. Lionel Berkeley of his having presented to Lieutenant-Governor Sir Donald McLeod the first flower that had opened from one of them. Mr. Berkeley could not inform me, whether they were the old cabbage moss roses, or only hybrids, such as are set down in English catalogues under the name of perpetual moss roses, and are far removed from being pure *centifolia* roses—that is to say, whether his roses, though western roses, had had by cross-

breeding so much of eastern blood transfused into them, as to enable them to bear an Indian climate. I may here observe that though cuttings of the genuine centifolia moss rose will not strike, I have found those of some of the hybrid varieties do so readily.

The moss rose, as such, has been supposed to be found only in northern climates: Dr. Lindley says, "Sir James Smith was informed in Italy, that the mossiness disappears almost immediately in that climate." Mr. Rivers however tells us of a traveller in Portugal, who found the moss rose growing wild in the neighbourhood of Lutra, more southerly latitude still. It would be very interesting therefore to ascertain, if still cultivated in the Punjab, whether it retains its peculiarity of mossiness there.

## II.—ROSA DAMASCENA · DAMASK ROSES.

Dr. Lindley, in his *Monographia Rosarum*, says: "From specimens from Ghazepore brought by Colonel Hardwicke it appears that *R. damascena* is there exclusively used for obtaining the essential oil." And as it is well known that it is the rose called in India the Bussorah, which is grown there for that purpose, it is evident that *R. damascena* is the botanical name for the Bussorah.

That the Bussorah moreover is identical with the variety known as the Quatre Saisons—"Four seasons" rose of the French—seems, from what Dr. Lindley further says, equally certain; and that it must be, in that case the *Rosa bifera*, the variety, which in Virgil's time gave the rose-gardens of Pæstum their renown. Again, Dr. Lindley affirms that it is the rose evidently described by Monardi as found in Persia, in his dissertation upon the roses found in that country;—an opinion which receives confirmation by its being in India sometimes called the Persian rose.

• The Bussorah appears to be the form of *R. damascena* such as we might almost expect to find it in its wild uncultivated



state. In this state, seemingly, it is alone capable of existing in India. For I know of no other form of the Damask rose that has been established in India,—not one certainly of the sweet, and completely double varieties, that in past years were so much the ornament of English gardens, as indeed of some few they even now are.

It is by no means uncommon for florists to bestow exaggerated and misleading epithets on their favourites: and this they have in some measure done to the Damask rose. For as regards the repetition of its blooming, the most that can be said of it is, according to Mr. S. B. Parsons, that it “will under peculiar circumstances bloom in autumn of its own accord, yet it can not always be relied upon to do so;” or in Mr. Rivers’s words: “by some peculiar excitability it often puts forth flowers in warm moist autumnus.” Hence upon such slender pretensions it has had given it the name of Four Seasons, and even of Red and White Monthly.

With reference to the roses of the ancients, Mr. S. B. Parsons intimates, that it was not the same rose-trees that blossomed twice, but that most probably by some retarding process, through the aid of green-houses, the Roman gardeners caused some trees to bloom at one period and some at another, and so gained for their rose-gardens the reputation of twice-bearing. For he says that “Jussieu and Landresse, two French gentlemen, successively visited Italy with the express object of finding this twice-bearing rose in Paestum or its environs, yet notwithstanding their carefully-prosecuted researches, they could find no traces of it whatever.”

I am not aware that the Bussorah ever blossoms more than once in the year in India; yet it is remarkable that the only one of the western roses, that can stand the climate of India, should have in some sense the property inherent within it, which I have spoken of as a peculiarity of eastern roses;—that of repeatedly blooming.

Dr. Lindley, writing long ago, says “its native country is

still not known with certainty." But independently of the name of Damask Rose, or Rose of Damascus that it bears, there are considerations which plainly indicate, whence at least it made its way to India. The name Bussorah itself would at once suggest the Arabian Port of the same name at the mouth of the Euphrates as the spot, whence in all probability it migrated to the East, and again the word attar, the name of the essence extracted from it, being pure Arabic, would lead to the conclusion that it must have come from Arabia.

Redonté in his large work on Roses, Vol. 1., p. 100, gives an amusing account of the discovery of the attar, of which the following is a translation :

"At a fête given by the Princess Noor Jahán to the Emperor Jahánghîr, the courtesan pushed luxury and extravagance so far, as to cause to circulate in the gardens a little canal filled with rose-water. While the Emperor was walking with her, on the border of the canal, they perceived a kind of froth formed on the water, which floated on its surface. They waited till it came to the edge to take it out; when it was perceived that it was a substance of the rose, which the sun had condensed, so to speak, into a mass. All the seraglio agreed in recognising that oily substance as the most delicious perfume known in India. Art then endeavoured to imitate, what first had been the product of chance and nature."

The account given by Bishop Heber of the manufacture of attar at Ghazee-pore is too well known for me more than just to allude to it here.

### III.—ROSA GALICA : PROVINS ROSES.

The roses of this group called oftener perhaps "French Roses" derive their designation from Provins a town in France, around which the typical rose of the group is greatly cultivated for medicinal purposes.

Among the French roses are many of the familiar ones of

old, such as the Tuscany, the striped *Rosa mundi*, &c., none of which have as yet found a footing in India.

#### IV.—*ROSA ALBA*: WHITE ROSES.

#### V.—*ROSA SPINOSISSIMA*: SCOTCH ROSES.

Of the roses of these two groups, each comprising a few of the old summer roses of English gardens, no more need be said than that none have become established in India; nor from their constitution seem ever likely to be.

#### VI.—*ROSA LUTEA*: AUSTRIAN BRIAR.

The roses of this group are very distinct in their mode of growth; and the leaves as well as the flowers have a scent quite peculiar to themselves. The Persian yellow is admitted to be decidedly the best. Its flowers, which are very double, are small; but it makes ample amends for that by producing them in great profusion. It has been introduced but not found to thrive in Calcutta; but there can hardly be a doubt of its doing well in the Upper Provinces; as the single did, which I had in my garden at Perozepore. The pruning to be adopted with these roses (though not climbers themselves) is all but precisely the same as with climbing roses in general; that is to say; thin out, but do not shorten.

#### VII.—*ROSA SULPHUREA*: DOUBLE YELLOW ROSE.

The flower of this rose is described as resembling that of a cabbage rose, large, globular, very double, of a fine citron-yellow, and without scent. It blossoms so shyly in England, that it is now rarely met with. It is said however to thrive well and open its flowers to perfection in Italy; and from the fact too, that (as Dr. Hooker states) it is found near Kashmir and in Afghanistan; and that both single and double states of it are cultivated abundantly in Persian gardens, we might fairly look for success with it, if not in Lower Bengal, where the damp might not suit it, at least in the Upper Provinces

of India. The rose is still obtainable from some of the English nurseries; and a trial of it in India would, I think, be most desirable.

#### VIII.—HYBRID PROvence.

The roses of this group are by some called Hybrid French; and they are perhaps as much entitled to the one appellation as the other; for as Mr. Rivers says of them; "they are exactly intermediate between the French (*gallica*) and the Provence (*centifolia*), partaking in almost an equal degree of both parents," and I may add that as neither of the parents will endure the climate of India, it is not to be expected that any of their off-spring would do so.

#### IX.—HYBRID CHINA AND HYBRID BOURBON.

With the roses of these two groups we might have hoped for some success in India; seeing that they owe at least half their parentage to Eastern roses. They are the issue of cross-breeding between China or Bourbon roses with Provence or French roses. But connected with the fact that in England they possess not the property of blooming more than once in the year, it is found that they have too much of the blood of roses of the West in them to make themselves altogether happy in an Eastern climate. Some of them have been introduced and have thriven well, but borne no flowers.

#### DIVISION II.—EASTERN ROSES.

##### 1.—HYBRID PERPETUALS.

It has already been mentioned that by the cross-breeding of an Eastern with a Western rose,—a China, for instance, with a French rose, a hybrid is produced, which partakes too much of its French parent to blossom more than once in the year. If however this hybrid be crossed again with a China, the off-spring, inheriting three quarters of the blood of the China to one quarter of the French rose, may possess just enough of the nature of the former to blossom twice. Should it be

found to possess this property, it secures for itself the name of Hybrid Perpetual. It is easy to understand that, by crossing and intercrossing and breeding in, hybrids may be obtained, containing any proportion, that may be desired of the blood of any Eastern or any Western rose; and that the larger the proportion it bears of the former, the greater its tendency to bloom again. And thus it is that an almost endless number of Hybrid Perpetuals have been brought into existence.

The term "Perpetual" again, is one of those exaggerated epithets, indulged in by florists, as I have had occasion to notice in speaking of the Damask Rose. Hybrid Perpetuals for the most part bloom but at two periods in the year. It may be said of a large number of them, that they barely do that.

The French use a far more truthful designation for these hybrids. They call them *Rosiers hybrides remontants*. I will endeavour to explain what is meant by this term "Remontant," and I shall, I think, best do so by comparing the different modes of blooming of the Western rose, the Eastern rose, and the Hybrid, we will call the Remontant.

The roses then of all three of these divisions, after in England having been closely pruned in April, (in October in India) soon send forth vigorous shoots, which two months after produce at their extremities clusters of blossom—in July in England, (and in December in India.) Then follows this difference, which we observe between them.

*First.*—The Eastern roses keep producing fresh shoots from all parts of the tree, which terminate in clusters of flowers, and so keep up an unintermitted continuation of blooming.

*Secondly.*—The Western roses produce fresh shoots likewise; but no shoot from any part of the tree afterwards terminates in flower-buds, till the following year.

*Thirdly.*—The Remontant when its first flowers are over, sends forth a fresh shoot from the first or second bud on the flower-stem below the decayed cluster of flowers. And this

fresh shoot again after an interval of two months, that is to say in September in England, and in December in India, bears a second crop of blossoms. And it is this property of a fresh flower-shoot mounting up immediately out of one that has just shed its flower, to which the French have aptly applied the term "Remontant."

From his explanation a note of caution will suggest itself to those who gather roses for bouquets from any Hybrid Perpetual. You may cut flowers from Teas, Chinas, and Bourbons, with any length of stalk you like, you will not thereby impede their soon yielding you flowers again. But cut off the flowers from a Hybrid Perpetual *the whole length* of the flower-stem (as is usually done, to have something to hold by) and you will have to wait till a whole year comes round before you may expect to cut any more; you will have carried off with your flowers the remontant property of the tree.

But then again mischief may sometimes happen from want of attention in an opposite direction. Flowers on decaying should be removed; or in many cases they will form seed-vessels, which to a certainty will impede the buds in the flower-stem beneath from breaking forth.

*Pruning.*—During the rains the roses of this group will make long rampant branches, terminating sometimes with a poor, solitary, semi-double flower. This tendency to a third blooming in India, may no doubt be accounted for by the stimulus they receive from the wet and heat of that period; whereas in Europe no such tendency is recognised, through their vegetation, after the second bloom, being rendered dormant by winter. And it may be possibly this effort towards a third blooming, that exhausts them for the season, when they are expected to produce flowers in the prime of their beauty. It would be well therefore to check this tendency as far as can be by removing during the rains every flower-bud, as soon as it makes its appearance.

In October all but four or five of the stoutest branches

should be cut *clean away*, and these should be 'shortened to about half a foot from the ground. At this time too, no amount of manure of the rankest and richest description, applied as surface dressing can be otherwise than beneficial. The topmost buds of these branches will then push forth with strong shoots, which in December will produce their first and finest blossoms : and by attention to the little precautions above-mentioned, flowers may be expected from them two months afterwards in February.

But it is upon the most meagre pretensions that many of the group maintain their claim to be considered Hybrid Perpetuals at all, merely putting forth a shabby flower or two at the second period of blooming. On visiting once a large nursery garden in July, I was told, if you wish to judge which are the most beautiful roses, now of course is the right time to come ; but if you want to know those that really deserve the name of Hybrid Perpetuals, you should come here in September. This is true enough, but at the same time, some of the group are so truly beautiful, that one may be well content with them for their blooming but once, should they never bloom a second time. Put in selecting roses of this group for India, it is, I consider of the very highest importance to ascertain to what extent they are twice-bloomers. Because, as I have explained, the very property of twice-blooming indicates, that they have much of the blood within them of some Eastern rose, to which this property peculiarly belongs. It is an opinion, I expressed long ago, and one which I have adhered to ever since, that the greater the tendency a Hybrid Perpetual has to blossom twice, the more of the China or Bourbon race it must have interwoven in it ; and consequently the better must it be suited to the climate of India. With this conviction strong within me, I solicited Mr. William Paul of Waltham Cross to do me the favour of marking for me in his catalogue the roses of this group, in which the Bourbon or China blood predominates. And by his kind compliance with

my request, I am enabled to give a list, which I trust, will prove useful for those to make their selection from who propose to enlarge their collection by a fresh importation from Europe.

The following are those Mr. W. Paul marked as partaking strongly of the Bourbon Rose :

Alfred Colomb.	Louise Darzens.
Bonle de Neige.	Madame Julie Daran.
Charles Lefebvre.	Madame Victor Verdier.
Comte Raimbaud.	Madlle. Eugène Verdier.
Countess of Oxford.	Princess Beatrice.
Coquette des Apls.	Princess Christian.
Dr Andry.	Senateur Vaisse.
Elizabeth Vigneron.	Souvenir de Dr. Jamin.
La Duchesse de Moigny.	

The following were marked as closely allied to the China :

Alphonse Dumaizin.	Lady Suffield.
Baron Adolphe de Rothschild.	La Brillante.
Biron Chanraud.	La France.
Devienne Lumy.	Le Rhone.
Duc de Cazes.	Lord Macaulay.
Duchesse de Caylus.	Louis Van Houtte.
Duke of Wellington.	Madame Alped de Rougemont.
Fridmand de Lesseps.	Marie Baumann.
Fisher Holmes.	Olivier Delhomme.
Géant des Batailles.	Pitord.
General d'Hautpoult.	Prince Camille de Rohan.
Jean Touvais.	Prince Eugène Beauharnais.
John Keynes.	

I may here add, I have noticed that the White Hybrid Perpetuals blossom continually during the summer and autumn, seemingly from having much of the Noisette breed into them ; as is very apparent in Louise Darzens. Such roses I should consider also well suited for India.



II.—*ROSA BORBONIANA*: *BOURBON ROSE.*

*Rose Edward.*—I have already pointed out two names that have been improperly assigned to this rose. I now call to notice a third, which it is often known by, and which I consider quite as wrongly given to it. It is that of “Cape Rose.” That it may have been conveyed to India by some ship, that touched at the Cape of Good Hope, hardly admits of a doubt. But it is a remarkable fact in the history of the rose, that though there is scarcely a country in the northern hemisphere, in which some species is not found indigenous, no rose has been hitherto discovered a native of the southern side of the equator. This rose then could not have come originally from the Cape, and the name “Cape Rose” should be abandoned as apt to mislead.

It seems all but certain it must have come direct from the Isle of Bourbon, or perhaps from the Mauritius. For there is scarcely room for question but that it is the identical rose said to have been discovered in the former island in the year 1817, and which had the name “Edouard” bestowed upon it, according to some accounts, after the Christian name of M. Perichon, the person on whose estate it was found. The rose Edouard was introduced into France, and in 1822 widely distributed. And it could not have been long afterwards, that this rose Edouard, or Edward (for I venture to maintain that they are one and the same) made its way to Calcutta. I have been assured by those, who were there at the time, it had become very common there, as early as in the year 1832. Its entire novelty, its large double flowers, its property of blossoming more or less throughout the whole year, and moreover the singular facility with which it can be propagated, must no doubt have contributed soon to find it a place in most gardens there.

The origin of the rose seems involved in some obscurity. Mr. Rivers states, that “it made its appearance in England under the name of ‘Lile de Bourbon Rose’ said to have been

imported from the Mauritius to France in 1822, by M. Noiset. But further on he adds, that "M. Breon, a French Botanist, and now a seedsman in Paris, who arrived at Bourbon in 1817 as botanical traveller for the Government of France, and Curator of the Botanical and Naturalisation Garden there, gives the following account, for the truth of which he vouches:

At the Isle of Bourbon the inhabitants generally inclose their land with hedges made of two rows of roses, one row of the common China rose, the other of the Four Seasons. Monsieur Perichon, a proprietor of Saint Benoist in the Isle, in planting one of these hedges, found amongst his young plants one very different from the others in its shoots and foliage. This induced him to plant it in his garden. It flowered the following year; and as he anticipated, proved to be of quite a new race and differing much from the above two roses, *which at the time were the only two sorts known in the island.* He propagated this rose very largely; and sent plants and seeds of it to Monsieur Jaques, gardener at the Chateau de Neuilly, near Paris, who distributed them among the rose cultivators of France," whence, Mr. Rivers adds, the name often given to the common Bourbon Rose of "Bourbon Jaques." M. Bréon named it *Rosé de l'Île de Bourbon*; and is convinced that it is a hybrid from one of the above roses and a native of the island."\*

It must be mentioned here, that the Chateau de Neuilly was then the favourite residence of the Duc d'Orleans, better known subsequently as King Louis Philippe. And it is a remarkable circumstance, that just at the time when this Bourbon Rose Edouard was distributed from the garden there, Redonté described and figured in his large work a rose, to which he attached the name "*Canina Borboniana*," of a bright rose colour (*d'un rose éclatant*) and of which he remarks: "this rose tree according to S. A. R. Monseigneur le duc

d'Orleans grows naturally in wild places in the Isle of Bourbon." Hence it is evident, I think, that this rose of Redonté could be no other but the Rose Edouard in question, especially after what is stated by M. Bréon above.

' The term "*Canina Borboniana*" signifies a variety of the Dog-rose growing in the Isle of Bourbon; and the strange thing is, how such a name came to be given to the Rose Edouard. I can only conceive that it must, by some inadvertency, have been written for "*Chinensis Borboniana*" which indeed would be its proper designation.

Altogether the history of this rose as regards India is very singular. Admitting, as most do, that its parents were the common China and the Four Seasons (our old friend the Bussorah) we are led to inquire how they first found their way to the Isle of Bourbon: and we conclude that it could not have been from China, inasmuch as the *R. damascena* is made no mention of by Mr. Bentham in his *Flora Hongkongensis*. Hence they must have been taken there from India. But it is strange that associated so long together as they must have been, not only in India, but in other parts of the world, they gave birth to this remarkable hybrid only in the Isle of Bourbon, where their introduction could have been of comparatively very recent date. The hybrid soon found its way to the land of its progenitors, under the name of Rose Edward. And now if I may venture a little upon conjecture, it would seem that after a time a plant of it must again have been brought to India, under the name "*Canina Borboniana*," given it by Redonté. This plant would of course be immediately recognised as the rose already introduced under the name of Rose Edward. The label then, it would appear must have been removed from it and attached to a Noisette rose, introduced perhaps at the same time, and without a name. And this would account likewise for the way in which the Noisette, that has for so many years been called "*Canina Borboniana*" first got the name it is so wrongly known by.

I have made diligent inquiries after Rose Edouard in England, wherever there seemed any likelihood of meeting with it, but without success. It has had its day there: and has now become all but forgotten in its posterity, the group of beautiful and continuous-blooming roses, which bear the name of Bourbons.

*Bourbons.*—Some of these are distinct enough, while between others, as for instance Rose Edward, the Queen, and Comtesse Berbantine, there appears at times little perceptible difference. Others again seem to have so little of the taint of mixed blood in them, that it appears but a mere arbitrary distinction to say they are anything but pure China. But although a plant of mixed breed may, as happens with individuals of the human race, by no resemblance in external features betray its parentage on the one side, still it may do so in a marked degree by temper and constitution. Mrs. Rosanquet, for instance, some place among the Chinas. But the comparative difficulty (if I remember right) with which it is multiplied by cuttings, points to something in its constitution, it owes not wholly to the China rose.

The roses of this group being so near akin to the China, and in some cases, in appearance, all but the same, thrive and blossom well, as might have been anticipated in India. The group however is not a numerous one; and possibly most roses of any high merit belonging to it, have been introduced, and become established there by this time.

*Pruning.*—Bourbon rose, like the China, give blossoms on every young shoot they put forth; and fresh shoots are caused by pruning in those that have already blossomed. Stems, that have become old and woody and hard, had better be cut down clean to the ground. If the plants be well fed, strong fresh shoots will spring up, surmounted often with a rather over-done head of flower-buds, the flowers of which, when open, though some may be good, are not of the best, the plant affords. The fullest and finest flowers are given by the shoots that spring from these root-stems, when their first

crop of blossoms has expanded and been removed.\* One peculiar character of the China-natured Bourbons is to produce in the cold season dense closely-folded buds, which are unable to expand, and in time rot at the heart and so perish. Such is notably the case with Rose Edward, Pheokina, Armosa, and Souvenir de la Malmaison. I have heard modes of pruning suggested as a remedy for this, but no pruning that I ever saw adopted made any difference; nor in fact can I understand how it should. The cause seems to be want of sufficient warmth at night at that season: for precisely the same thing happens in England to roses with similar-formed thick-petalled buds in the chilly nights of early summer in the open air. Placed in a green house they open to perfection, though they receive there nothing like the amount of heat they get beneath an Indian sun in December by day; while they enjoy a temperature by night, which nowhere in India they obtain at that period of the year in the open air.

### III.—BOURBON PERPETUALS.

“This group” says Mr. W. Paul, “embraces the Hybrid Perpetuals of some catalogues, in which the characters of the Bourbon rose are strikingly developed.” The Bourbon character indeed is so strongly marked in many of them, that there are those, who do not see sufficient reason to separate them from that group. In some, however, as Baron Gonella, for instance, the inbreeding of the summer rose is at once detected by the attar-like scent, as well as by possessing less of the property of continuous blooming that belongs to China-natured Bourbons. There are few probably but what would thrive and blossom well in India.

As regards propagation and cultivation, they would require the same treatment as pure Bourbons.

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\* It occurs to me that Mr. MacMurray has made the same observation in some remarks on the Cultivation of the Rose he sent to the Journal many years ago.

IV.—*ROSA INDICA*; CHINA ROSE.

As regards the roses of this group, there is really very little to be said more than that in India they are in their home, where they thrive and blossom to perfection. They are few in number, and all of much merit, but some two or three perhaps are already established in India.

*Pruning.*—The same treatment may be adopted as that recommended for the Bourbons. That is to say: in October cut out the old, hard, and decrepid wood clean away from the centre. Shorten the branches that remain; and at all subsequent periods merely cut off the trusses of decayed flowers.

V.—*ROSA INDICA FRAGRANS*: THE-TEA ROSE.

Unlike most plants introduced from China, the Tea-rose thrives and blossoms to perfection in India. There are no roses perhaps so thoroughly deserving of all the care and attention that can be bestowed upon them, than the various members of this group. The perfume too of many of them is so delightful, and so totally distinct from the attar-scent of the Western roses; though it is true, that when given out in excess, as sometimes happens with *Devoniensis* for instance, it may become highly offensive. Some however on the other hand have but very feeble or scarcely any scent.

The varieties are rather numerous, in some catalogues amounting to little short of a hundred. But it appears to me, a good proportion of them might be well suppressed, as the difference between many is scarcely perceptible; and several, of the rose-coloured ones perhaps in particular, though pleasing in the bud, open with poor flimsy, semi-double flowers.

I cannot undertake to describe all of the most meritorious; but I will mention a few, which, during the past season, have attracted my attention for their especial beauty.

As fine, large full, thick-petalled roses of creamy white or palest yellow, I noticed *La Boule d'or*, *Mélanie Willermoz*, *Madame Bravy*, *Moiret*, *Niphetos*, *Sombrenil*, and *Sou-*

vénir d'Elise Vardon. All these I make, no doubt, would prove charming roses in India.

Of deeper yellow hue Vicomtesse de Cazes and Madame Margottin, I thought delightful roses, the latter setting off its flowers to admiration with its fine luxuriant foliage.

Madlle. Cecile Berthod, a new rose, produces flowers, which appeared to me of a deeper yellow hue, than any I had yet seen.

Perfection de Montplaisir, a new rose likewise, is not so remarkable for the beauty of its canary-yellow flowers, as for the great profusion with which it bears them.

Of rose-coloured varieties quite unexceptionable in fulness and beauty of form seemed to me Comte de Paris, President, Rubens, and Souvenir d'un Ami.

It must not be concluded that I set down all beside the above-mentioned as of inferior merit. I merely speak of such, as I know, of my own observation to be of high worth.

The roses *Devoniensis*, *Elise Sauvage*, *Gloire de Dijon*, *Goubault*, have been too long introduced, and their merits too well known, to need more than the mere mention of them.

*Pruning.*—Tea roses may be treated pretty much in the same way as recommended for roses of the China group. They vary much however, in constitution and vigour of growth; and some will consequently make head against bad cultivation far better than others. The more delicate ones, if left in a bad soil and unattended to, will produce a crowded mass of short angular decrepid sprays, giving but poor half-sized flowers. In October these should be cut clean out, to promote the growth of new wood. But it must be borne in mind that the new wood, then produced, may be as poor as the old, or poorer, if the soil be not at the same time enriched with a good surface-dressing of cow-manure, or indeed any other manure available, it hardly matters how strong.

VI.—*ROSA MOSCHATA*: MUSK ROSE.

Dr. Lindley, relying apparently upon Roxburgh's authority, states in his *Monographia* that "there was no ground for the assertion that this was a native of Hindoostan." But Bentham, in his *Flora Hongkongensis* says, that it is common in the mountains of Northern India, Barbary, and other parts of Northern Africa have usually been alleged to be its native place. Its range in fact seems to be very extensive, as it is met with also abundantly in Persia. From the specimens I was permitted to inspect in the Herbarium at Kew, it appears to vary considerably. Botanists seem to have arrived at the conclusion, that if not actually identical with, it is but a variety of *Rosa Brunonii*, a wild rose of the Indian Hills. Professor Kail Koch says, they are alike but for the harshness of the latter.

As found in the gardens of India, the musk rose is in general a dwarf plant: but its ordinary height elsewhere is stated to be six or seven feet. It is recorded, moreover, that "Olivier has seen trees of it thirty feet high in the King's garden at Ispahan."

This rose in the present day possesses little interest as a garden plant, except for its peculiar, though not very strong fragrance, which, as its name denotes, is thought to resemble that of musk. It is especially remarkable too, like *R. multiflora*, for the large dense clusters in which it bears its flowers.

VII.—*ROSA NOISETTIANA*: NOISETTE ROSE.

The original rose of this group is stated to have been a cross between the musk-rose and the common China, raised by the gardener, whose name it bears. The varieties bespeak plainly enough their origin in the crowded trusses of small, very double flowers they produce; and some, *Aimee Vibert* for example, in their distinct musk-like odour. Others, however are all but scentless.



‘ They are almost constantly in blossom, but in the height of their beauty, perhaps in February, provided they have been closely pruned the previous October. The number of varieties is small: and probably the principal ones of the group have ere now become established in India.

I would here observe that in my Manual of Gardening, I have headed the list of the Noisettes by a variety named “Nitida.” This is a mistake. Nitida is the specific name of an American rose quite distinct from any existing in India. The rose was one of little merit, and I scarcely remember much about it now; but I conjecture it must have been the Tea rose “Nisida” mis-spelt “Nitida.”

#### NOISEITE, TEA-SCENTED.

The roses of this section are in catalogues almost uniformly combined with those of the last. They are however in many respects very distinct. This is at once discerned in the extended growth of their stems, their very much larger flowers, with their tea-like scent, and the comparatively small number of them borne in the truss. They are magnificent roses, and well suited to the climate of India as witnessed in the long established favourite Solfaterre. Conspicuous amongst them, as a charming object, I would call attention to Ophurie, when as usually happens, it forms a large bush of dense glossy foliage, scattered over with its sparkling salmon and fawn-coloured, rather untidy flowers. Triomphe de Rennes is likewise a lovely variety, when shedding, as it does, an abundance of its pale yellow flowers. Maréchal Niel likewise, the most magnificent of all yellow roses known, though placed usually among the Teas, belong properly to this section.

#### DIVISION III.—CLIMBING ROSES.

With exception of the Sweet Briar, which seems to succeed everywhere, no truly Western climbing roses have been found to thrive and blossom freely in Bengal. None of those

known under the name of Boursault, Ayrshire, and Evergreen, seem, if ever introduced, to have kept a footing in the country. One or two of the native single-flowered kinds, *R. ternata* and *R. involucrata*, which do well enough in the garden, if thought worth a place there, form an exception to what I have said respecting Eastern roses, in that they have but one season of flowering. On the other hand Fortune's yellow, a native of China, and consequently an Eastern rose, has been introduced and found to thrive vigorously; but associated with the fact that it is a one-season bloomer, has never produced a flower in Calcutta.

And so again the White and Yellow Banksian, though Eastern roses, blossom but at one season in the year; and succeed so indifferently as to be scarcely worth cultivating. Pretty much the same may be said of *R. multiflora*, and *R. gigantea*. The last I have never seen in flower. There is one climbing rose however, which is both an Eastern rose and a constant bloomer: but of the introduction of which I have not heard that any attempt has been made. And that is *Maria Leonida*, the well-known Macartney rose of English gardens, introduced from China. This is a lovely large white double rose, with the perfume of ripe apricots. The flowers are set off to perfection on its rich dark-green shining foliage. There seems good hope that this might succeed in India. The trial at any rate is well worth making.

*Training and Pruning.*—From what has just been stated, it will be seen, that after all, it is to the Tea-scented Noisettes, that the gardens of Bengal, at least, must be indebted for their climbing roses. But the training and pruning, I am about to prescribe, is what I believe should be adopted for all climbing roses indiscriminately.

The property of all such roses is to send forth stems of great length, towards the ends of which shoots are emitted, which bear the flowers. If then these stems are much shortened, the lower portions of them which remain emit shoots,

but these shoots bear no flowers. The mode of proceeding then will be as follows :

1. Insert bamboo stakes in a circle round the plant. Cut out clean away to the ground all but three or four of the aforesaid long stems. Train the three or four stems from stake to stake in a spiral form round the plant, and allow them to grow to their fullest length.

2. Cut out all sprays and small wood at the bottom of these stems so as to keep them clear of wood a foot or two from the ground. This will render the plant accessible for applying surface-dressings.

3. When the stems become old, and show signs of decrepitude, cut them out and train new ones in their place.

4. The only pruning required if any will be just to take off about six inches from the end of the stem & will give greater strength to the flower shoots just below.

Another method sometimes adopted is to dispense with all means of support, and to lay the long stems on the ground and twine them round in a watch-spring-like form, and press them down to keep them in position. This, when well managed in a circular bed, made for the purpose, has a very good effect.

I shall now conclude this paper with a few remarks upon the

#### PROPAGATION OF ROSES BY BUDDING.

*Stocks.*—I have long been of opinion that the most successful and expeditious method of multiplying roses in India would be by budding them in the same manner as they are done in England on what is called the Manetti stock. The Manetti rose M. Eugene Forney makes a variety of *R. paxinifolia*; but it is no doubt, as Professor Karl Koch states, a variety or hybrid of the common China. It is remarkable for the facility with which it can be struck by cuttings; and is used in England always as the stock for dwarf-budded roses. The

manner in which cuttings are prepared for the purpose, I have given in my manual, as described by Mr. Rivers, and is briefly this. The cuttings are from one-year old shoots, cut into lengths of one foot and inserted two-thirds of their length in the ground. When these have struck and become established plants to be budded upon, the earth is removed about four inches deep, and the bud inserted in the part of the stem thus uncovered. One object in removing the earth to insert the bud is that the bark on the underground would always yield with the greatest readiness to receive the bud; which is not by any means always the case with any portion of the stem above ground.

After the bud has pushed forth, the earth is covered in again over the place of its insertion, which ever afterwards is kept thus buried. The plant consequently presents all the appearance of being on its own roots. The Manetti stock being an Eastern rose sends up no rooted suckers as the Dog-rose does, but frequently buds will break and shoots emerge from the stock below where it is budded. And from the stock being closely related to the rose, budded upon it (both being hybrids of the China) these shoots will perhaps so resemble the shoots from the graft as to escape detection. Of course this, if not attended to, might end in the serious injury, if not the death, of the graft shoots. On the other hand, if precaution be taken to remove these shoots when discovered, and the plants be kept vigorous and thriving, in a year or two, it is said, the graft-shoot forms roots of its own; and the stock on which it is budded, perishes. The plant then becomes simply one on its own roots.

Now it appears to me that all the advantage derived from the Manetti in England may be gained from the Rose Edward, in India treated exactly in the same way. And I make no doubt, but that if cuttings of the Rose Edward were laid down at the beginning of the rains as directed above, they would form strong plants ready for a similar mode of operate

ing upon by the following February. A supply of such rooted cuttings always at hand for working, whenever a chance bud of any new rose could be obtained would be invaluable. And now that communication by post is so rapid, wood containing ripe buds from friends at any part of the country might at all times be turned to account.

*Buds by Post.*—It may be remembered that in my Manual I mentioned the circumstance of my having, when at Ferozepore, become possessed of the Briar Yellow Rose by buds sent me in this way. And as that was, I believe, the first time of anything of the kind having been attempted in India, it may not perhaps be uninteresting if I describe the circumstance at length. It is now above twenty years ago, when, stationed at Ferozepore, I heard of this Briar, and of the beauty of its large mass of sparkling yellow flowers when in full bloom. Anxious to become possessed of it, it occurred to me that I might do so if I could only procure cuttings of it with ripe buds upon them. Having a friend at Peshawur, where the rose was to be found, I wrote to him to send me some cuttings. These came to me (if I remember right, at my recommendation) in an eau-de-Cologne bottle into which a little water was introduced, just to keep them moist. It was a mistake; they turned out sodden and worthless. It was in September, at the very hottest period of the year that I wrote again, and received in five days after they were despatched, another package of them wrapped up in dry cloth. This appeared a mistake in the opposite direction, as they arrived as dry as chips. It fortunately happened however, that they came on a Sunday; or I might otherwise have commenced operating with them at once; and had I done so, I should probably have quite failed, and thrown them away as useless. But as it was, I folded them up in a damp towel, and laid them in my bath-room. Early on Monday morning, on setting to work, I found they had become sufficiently softened for me to remove the eyes with tolerable ease. They

looked however very unpromising, and it seemed almost a hopeless proceeding, still; having found several trees of the Rose Edward that yielded their bark readily, I inserted about twelve or fifteen buds. And in the numberless times I have performed the operation of budding I never met with greater success. Nearly every one took, and on the following March, my garden was quite gay with the flowers they produced. Gladdened with this success, I wrote to a friend at Meerut to send me cuttings of the Koozeah rose, in praise of which my mâlees had often spoken to me, but which I had never seen. The cuttings were the same length of time on their journey, and with them I was equally successful. Now this gives rise to the consideration, whether it be not better on the occasion of budding to keep the wood containing the buds some little time, till their vitality has become unimpaired, before performing the operation. I am aware that this is opposed to the directions usually given, and that it is enjoined that the buds should be removed, and the operation performed as speedily as possible, after the cutting containing the buds has been taken off. In the analogous operation of grafting however, there is little chance of success if the graft be cut from the tree, and applied at once to the stock at the time of grafting. But the graft must be cut in the winter, and preserved in the ground three months before the time arrives for it to be used, in order that its vitality may be enfeebled at the time that it is applied to the stock. Now it seems to me, that the proceeding that is necessary in the case of grafting, must for a similar reason, be at least beneficial in the case of budding. It is a question however of not so much importance practically, for budding, if performed with but ordinary skill is successful nearly in all cases.

*Cultivation of the Mahogany Tree in Bengal. By Dr. G. HENDERSON, Offy. Suptt., Royal Botanical Gardens.*

[Communicated by the Government of Bengal.]

I have the honor to report as follows on all that has been done since I took charge here in December last to raise and distribute mahogany plants through this country, and also all the observations I have made on the culture of this valuable timber tree.

2. Three batches of seed have been received from Jamaica. The first consignment was received in March last, namely, two large boxes containing enough seed to plant out fifty acres of ground. This had been packed with the capsules entire in finely powdered charcoal, and most securely enclosed in a tin-lined case well soldered. Of all this seed not a single one was fresh, and I at the time pointed out that seeds which soon spoil should be sent in canvas (not water-proof) bags by sample post, as this gives them by far the best chance of arriving in good order. Being stowed amongst the mails, they are sure to be kept dry, and at short intervals they are exposed to air, and are thus not likely to become mouldy; but another advantage of this mode of transit is that there is no delay in transhipment or in clearing them at custom houses.

3. In August last two packets containing together 800 seeds were received by post from Dr. Hooker, and as I predicted would happen, every seed has germinated. On 10th September a large tin-lined box arrived from Jamaica, and was found to contain 8,400 seeds packed in roughly powdered charcoal. Fortunately the tin was so badly soldered that a quantity of the charcoal had got shaken out, and air had thus access to the seeds, which were quite fresh as far as absence of mould or decay goes, but though sown the day of their arrival, they seem not to have had sufficient vitality left, for after 20 days only 200 seeds have germinated, and I do not expect to save five per cent. of them.

4. As I understand that the Forest Department intend to import large quantities of mahogany seed, I would urge, most strongly that if not the whole, half at least should be sent off, if possible, the very day they are gathered, in canvas bags by sample post; and to prevent the seed being broken, which they are very apt to be, they should be sent enclosed in their capsules, which would require each capsule to be tied up with twine. This mode of conveyance will avoid all agents' and other landing charges, and may even turn out to be the cheapest, as it is certainly the most certain to secure success.

5. These remarks apply to the conveyance of every description of seed. And whilst on the subject of the safe transmission of seed, I may mention a mode of safely sending seeds which will not keep good for many days. Al seed, for instance, which very often germinates before it falls from the tree, and Theobroma seed, which seldom arrives fresh. I have just succeeded in importing a large quantity of Theobroma seed by having it planted as soon as gathered in a Wardian case and at once shipped. On arrival, the seed had all germinated, and the young seedlings were almost all in a very healthy condition.

6. As more than a thousand plants of mahogany had been raised in 1872 from some seeds collected near Barrackpore, arrangements were made to get more seed this year, and about 500 altogether were secured, and about one hundred more were got in these gardens, not from the old damaged tree which usually seeds, but from a younger bushy tree, which, there is reason to believe, was raised from a larger. The list appended shows that nearly 800 plants have been sent out. I fear, however, that nearly half of these will fail to establish themselves, for mahogany seedlings make but slow progress during the first five years, and if kept in pots even for a few months or until the taproot gets twisted, the tree always remains dwarf, for many years at least.

7. On the way from Sikkim I lately saw a number of fine



mahogany trees on the road-side close to the place where the mail-cart horses are changed at Titalya. I have ascertained that these trees were probably planted about ten years ago by the late Dr. Anderson, and I was pleased to see that they thrive in that wet climate quite as well as in Calcutta.

I have failed in all attempts to raise mahogany from cuttings; many thousands of cuttings have been planted; they almost all made shoots, but no sign of rooting was ever observed.

8. Several hundred layers were very carefully made, but though many have succeeded, the majority I think have failed to root. I have taken some trouble about getting layers, as plants thus raised are very much more likely to produce seed early, but from their tendency to form low branching bushes they are not likely to produce much valuable timber.

9. Although we must for the present depend on Jamaica for seed, I think it very probable that the trees in this garden will soon begin to seed freely, or at all events may in some exceptional season set a large quantity of seed; all the older trees are literally covered with flowers every year in the months of June and July, and flower more sparingly all the year round, and it would be interesting to know at what season the few seeds now obtained here set. We might then use a little pressure to make the trees flower more freely just at that particular season, for I have no doubt whatever that when the trees are covered with blossom the reason why the fruit fails to set is probably owing to the climate of Calcutta being too damp or too dry, or perhaps too hot or too cold just at that particular season. I reported before that ringing the bark of some very large branches has been tried by me to see if it will induce these branches to set the fruit, and that the effect was to cause shedding of the leaves a fortnight earlier, and that the damaged tree, which seeds also, shed its leaves a fortnight before the others. It still remains to be seen if these branches will seed. I have carefully examined them, but have seen no fruit.

10. I have planted out permanently in this garden about six hundred seedlings, and having carefully studied the treatment which seem to suit them best, I find—

11. That they should be planted out permanently when very young, say before they are six months old, otherwise they remain stunted.

12. In the climate of Calcutta they will not thrive when young without shade—I mean lateral shade—so as to prevent the direct rays of the sun striking them for more than two or three hours every day. Shade over-head makes them twist and bend, and spoils them as trees; but half an hour's inspection of young trees here of from one to three years old, shows that lateral shade is almost essential for them in Calcutta for three years. I believe the baking of the earth about the roots and the intense heat of the sun striking on the young stems, have the injurious effect.

13. The kind of shade which appears to answer best is Casuarina; and as this tree in two years attains a height of 20 to 30 feet, and affords excellent timber for fuel and charcoal, I would suggest that if extensive mahogany plantations are to be made, the seedlings be planted 30 feet apart with the space between filled in with Casuarinas 12 months before the mahoganies are planted; the Casuarinas will be fit to cut for fuel at five or six years of age, just when the mahoganies are independent of any shade but their own.

14. Young mahoganies are very liable to have the top shoots attacked and injured by insects, and should therefore not be pruned for several years, they should at first be allowed to form a bush, partly to shade the ground, but chiefly because if only one leader is left it is likely to be damaged by insects.

15. After the tree fairly takes a start very judicious pruning will probably double its ultimate value; for three-fourths of the large trees in this garden have such a multitude of stems that they can never be expected to form large timber.

I notice that a few years ago attempts have been made to prune some of these trees, and the result is very instructive. So the trees, from which branches six inches to a foot diameter have been cut off, have completely healed their wounds; whilst others have had the stumps attacked with decay, and this extending to the heart of the stem has entirely spoiled the trees. The only reason I can suggest for this great difference is that some were pruned before the rains or during a very wet season, and consequently the wounds never healed, and that the others were pruned after the rains or in a very dry season. We require some careful experiments on this subject, but they must extend over several years. Fortunately there is ample field in this garden for such experiments amongst the numerous trees which appear to be under 20 years of age.

16. Seedling mahoganies if allowed to become choked up with grass cease to make much progress, and if large plantations are to be formed, each plant should get quite as much if not more care than a cinchona plant, and perhaps an occasional manuring. At 30 feet apart, or say 50 trees to the acre, digging about the trees and manuring them for five years, will not cost much, and possibly the Casuarina nurses will pay all expenses.

17. If large plantations are to be formed, I would very strongly urge that they be not all put in the Terai on account of the risk from fire: they may escape for some years; but on account of the unhealthiness of the climate it will very likely happen that those in charge will frequently be changed, and in some very sickly year the plantation will be left entirely to the tender mercies of the coolies for a few months at the end of the year; it will then get hopelessly overgrown with grass, and in all probability will be burned down.

18. A large number of mahoganies might be planted along selected roads, with great advantage; each mile of road will take 350 trees at 30 feet apart, both sides being planted.

*A few Notes on the Atlas Worm.* BY C. BROWNLOW, Esq.,  
Corresponding Member.

The eggs of one female in number about 300 (a large and healthy female will lay as many as 400) were laid on the 11th and 12th October, and placed out on the tree on the 19th, being the 8th day, (on which they might be expected to hatch) in a small paper funnel, and covered over with a pocket handkerchief, which was tied close round the enclosed branch, so as to prevent ants from getting in, especially that voracious and venomous fellow the "duhya pipra" a couple of which would soon account for a brood of young caterpillars. It is in this stage the greatest care is necessary, as very young worms are apt to disappear most unaccountably, and in considerable numbers, if not kept within a small compass. I have for instance had a batch on a branch hanging in my verandah and had been puzzled to account for their disappearance until I detected a small wasp, ("budah,") carry off a couple within as many minutes.

The branch enclosed in the pocket handkerchief consisted of young and tender leaves, and on these the young brood (hatched on the 20th) fed comfortably for a week before they exhausted the supply of foliage. By this time they were grown upwards of an inch in length and were let go not as yet on the tree, as they were not large enough, but on a bough large enough to be included in a tolerable-sized mosquito net. Here they remained another week, by which time they had become the size of one's fore-finger and were therefore safe from injury by any except large predatory animals, and chiefly crows and other birds, they were therefore allowed access to all parts of the tree being now protected only by a coarse fishing net, thrown over as in protecting leeches trees. It was curious to see the systematic way in which the worms went to work, regularly from the extreme twigs downwards, and leaving nothing except the stumps of the leaves  $\frac{1}{4}$  of an inch in length; so that when the worms had descended

to the lower boughs; there was not a leaf left above. I had apprehended that when in such numbers they would disturb and make each other restless by crossing and interfering with each other, but I found this not in the slightest degree the case; they ate and slept and grew at an astonishing rate, and seemed to be as docile and to promise as easy domestication if it should be worth while to try and domesticate it, as the castor oil silk-worm. It is interesting to watch a young brood of these latter, and to note their economy of food, the whole batch laying their heads together like a regiment of soldiers and mowing away the leaf in line before them; the Atlas in the same way wastes very little, and after a whole tree has been laid bare, a few bits of leaves only can be found on the ground beneath that have escaped their shearing jaws. Whereas the time of laying of the eggs extended over only two days, the time of spinning was protracted over a week, the first cocoons being formed on the 6th November and the last on the 15th, the worms, when ready, came down and spun on the lower branches without showing any inclination to stray by descending down the trunk on to the ground; of course to ensure the worms not straying, it is necessary not to put too many of them on one tree, the Pollard in question I found to be sufficient to sustain 150 worms with a few branches uneaten for spinning in, and this was the number of cocoons eventually procured from the 300 eggs laid by the female moth. I might here mention that she was impregnated by being placed out on a tree holding on to her cocoon; the sluggishness of the females makes it quite unnecessary to tie them. It is one of the most singular things in nature, how, no matter on what sort of tree the female is placed, and however far in among the foliage, the male never fails to find her. It cannot be sight, as I have frequently placed them purposely, so that they could not possibly be seen, and is probably some sense of perception of diffused atoms to which that of the fox-hound affords but a very faint approach.

I found that even at night an out of door brood of worms is liable to depredations. Happening to visit the tree with a lantern, I detected a large Tocktay\* or Gecko lizard in the act of carrying off one of the largest worms, shaking it furiously at intervals, as a terrier would a rat; fortunately these lizards are not very abundant and may be kept under by cutting down any old trees in the vicinity in the crevices and crannies of which they lodge.

*Notes on the cultivation and preparation of Tobacco in the district of Nuklea. Communicated by C. C. STEVENS, ESQ., Collector of Nudda, dated Kishnaghur, 19th Feby. 1874.*

With reference to your Circular dated 7th December 1873, of which a copy has been sent me by the Commissioner, I have the honour to inform you that I shall be able to supply you with some facts, and further that I can arrange to provide you with three samples of tobacco, one of which will be procured by the sub-divisional officers of Ranaghat, and two by the sub-divisional officers of Bougong.

2. The estimated cost (including all expenses) of the two

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\* This Tocktay lizard called by the natives "kokye" is about 6 to 8 inches in length, of greenish colour, mottled over with red specks, and with the most baleful looking eyes that can be conceived, yellowish green by day, with a narrow slit constituting the pupil, this expands at night, so as to make the eye dark-black, the feet are like those of the common house lizard with suckers under the toes.

One of them at least generally contrives to find a lodgment in the mat and bamboo houses of the district where its noise very different from the gentle tick, tick, tick of the "tick-tick" or small house lizard, is sufficient in the dead of night to awaken the soundest sleeper. The tocktay begins with a loud rattle or clatter, as if to call attention. This is followed by a louder and more imperative rattle, and when every body may be supposed to be listening, he strikes in deliberately with tock tay, tock tay—a moan, tock tay, another moan, tock tay, a last and final moan, with which he winds up not to be heard again for two or three hours.

maunds from Ranaghat is about Rs. 24, and of the four maunds from Bongong is about Rs. 42. If you will kindly forward those respective amounts to the officers mentioned, they will endeavour to carry out your wishes in a satisfactory manner.

3. Replies to most of your questions, besides some further information, you will find in the enclosed copy of a Report which I compiled for the Commissioner in June last. There are however one or two points to be added.

(1)—Hingli tobacco of different qualities is that which is consigned to Calcutta.

(2)—The present market prices are from Rs. 7 to Rs. 10-8 per maund. These high rates are due to the very short crops of this year.

3)—I regret that I am not able to give you a trustworthy answer as to the capacity for improvement possessed by any particular kinds. Of the two sub-divisional officers whom I have consulted, the Deputy Collector of Ranaghat considers that the cultivators do not take the greatest possible amount of pains, and the Assistant Collector of Bongong thinks that improvement is not possible without great outlay. On this head you will perceive from the account of the cost of cultivation given in my Report that the crop is very expensive to grow. So far as I can form a guess, I should say it is probable that improvement could be effected. Such improvement must however originate from without.

4. I desire to express my hope that the estimates given in paras. 4 and 18 of the Report may not be taken to be worth more than they really are. They are merely the best approximations which I can give with the means at hand.

5. I shall be most happy to render you any further assistance in this or any other enquiry which your Society may take up.

*From C. C. STEVENS, Esq., Collector of Nuldea, to the Commissioner of the Presidency Division, dated Kishnaghur, 27th June, 1873.*

In reply to your No. 13 R. G., dated 28th April, I have the honour to make the following report :

2. Tobacco is grown throughout this district. It is however generally grown merely for domestic use, and it is only in the southern portions of the Ranaghat and Bongong subdivisions that it forms an important crop. A cool damp climate is supposed to be the most favourable.

3. I regret my inability to state what area of land has been cultivated with tobacco during each of the past five years. Throughout the greater part of the district, tobacco is grown in very small patches, the area of which it is difficult to estimate without special enquiry. Roughly speaking, I should say that the quantity of land under tobacco is 8,000 or 9,000 acres, of which about two-thirds is situated in the subdivisions of Ranaghat and Bongong. The fluctuations during the last five years are believed to have been slight.

4. The average quantity of produce per acre is said to be about nine maunds.

5. The cost of cultivation appears to vary considerably. In Bongong it is said to be from Rs. 21 to Rs. 30 per acre. In Ranaghat it is estimated at nearly Rs. 54 per acre. In Choodanga the cost is said to be Rs. 16-8 per acre ; in Meherpore, Rs. 34 per acre ; in the Sudder, Rs. 18 per acre ; in Koostia, Rs. 10 to Rs. 12 per acre. In considering these various estimates it must be remembered (1) that only in the two first-named subdivisions tobacco can be fairly called a crop, and (2) that the quality of the produce of those two subdivisions is deemed to be very good, and probably more care is devoted to the cultivation. The details of expenses supplied by the Deputy Magistrate of Ranaghat are as follows :

Manuring	...	6	0
Ploughing	...	21	0 — 27 0



Planting	...	2	4	—	27	0
Digging	...	6	0			
Irrigation	...	6	0			
Topping, &c.	...	3	0			
Cutting	...	3	0			
Rent	...	6	6	—	26	10

Total Rs. 53 10

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Several of the items appear to me to be excessive, and I am more disposed to rely on the estimate of the Assistant Collector of Bongong.

6. The quality and price vary considerably. The best tobacco is called the Hingli tobacco from Hingli, a village in the Gopalnaghur Thannah, of Bongong sub-division, where a plantation of some 40 acres exists. Tobacco going by the name of Hingli tobacco is however grown in other places, and it is said that there is no other sort in the Ranaghat sub-division. Hingli tobacco sells for from Rs. 5 to Rs. 7 or Rs. 8 per maund. Of other descriptions, the following have been mentioned to me :

- (1)—Chotna.
- (2)—Panbitta.
- (3)—Mandhatta.
- (4)—Baran.

The price of these inferior descriptions varies from Rs. 2-8 to Rs. 5 per maund.

7. High, dry and open lands are selected for the cultivation of tobacco. In those parts of the district in which the plant is grown only for domestic consumption, it is usually to be found on homestead lands.

8. The preparation of the soil commences in February ; it is then ploughed and in some parts at least of the district, clay taken from the bottom of tanks or bheels is spread on the land. Successive ploughings go on till September when the

refuse of cow-houses is added ; the land is ploughed once more and prepared for the reception of the plants.

9. The seed is soaked for a day and then sown thickly in beds carefully prepared ; a seed-bed of 10 katas will afford plants enough to cover 10 bighas of land when transplanted. The seeds germinate in about a week. In the course of about a month and a half, the plants which have by that time developed three or four leaves and are two or three inches high become ready for transplantation. While in the seed-beds, it is said that they are liable to injury from fogs, and the damp is washed off them with water. The reason for this process is not quite obvious.

10. The young plants are next transplanted into the places where they are to remain ; they are placed in rows from 1 foot to 2 feet apart. Each plant is plentifully watered, and is protected from the direct rays of the sun by leaves or straw ; these coverings are removed at night. In a few days the young plants become established and begin to grow rapidly. The earth is then turned up round the roots of each plant and the branching shoots are broken off ; in about a month after planting, the tops of the stems are broken off, so as to prevent the plant from flowering. From six to twelve leaves are left on each plant, according to its size and the strength of its growth. The earth is again hoed up round the roots. The plants are watered twice, *viz.*, once in November and once in January.

11. In January or February, the plant is ready for cutting. Usually the stem is cut at about the middle or lower, the leaves being left on the upper or cut portion, and those on the stumps being also collected. These stumps sprout again and the leaves are gathered, as they become ready ; this second crop is, however, invariably inferior to the first, and is kept for house consumption. The second crop is not irrigated.

12. When cut, the stems with the leaves on them are allowed to remain, spread out in the sun, for two hours ; they are

then cut into pieces, each of which consists of a pair of leaves, and a portion of the stem. These pieces are then arranged on the ground, in layers of nine or ten inches thick, and allowed to remain in the sun, for two days. Rain of course, at such a time, is most destructive. The tobacco in this half dried state is taken home by the cultivator, who strings together and suspends on rows of strings, in the longest apartment of his premises, usually the cow-shed. The leaves after being thus suspended for about a month, are thoroughly cured. They are then taken down on a damp or foggy day, when they are a little soft, and made into bundles of about  $1\frac{1}{2}$  maunds weight each. The strips of leaves being cut into lengths of about a yard and folded over and laid one over on another.

13. The above description relates to the Hingli tobacco of Ranaghat; the inferior sorts appear to be merely made up into bundles and subjected to the alternate action of the sun's rays by day and of the dew at night.

14. Each plant produces about a quarter of a seer at the first, and a chittack or less at the second cutting. Of the first crop, the upper sections are considered the best, but they are not separated from the others.

15. The strings used in the process described in para. 12, are made of thatching grass. The grass is cut in July when green, and soaked in water for a day and a night; it is then dried and made into bundles. The string is made by twisting together three blades.

16. It may be noted that the same land may, without detriment, be used for tobacco for several years continuously; but it is usual, where this is an extensive crop, to raise dhan for a year or two at occasional intervals.

17. The only manufacture of tobacco is its immediate preparation for use, by powdering or cutting into small pieces, and mixing with treacle and spices. The best preparation of this kind is said to be made at Santipore. The local con-

sumers of tobacco are mostly male. Among Hindoo women only prostitutes are said to use it.

18. In four sub-divisions of the district, the quantity grown is scarcely sufficient to provide for local wants; from Ranaghat and Bongong, the annual export may be estimated at about 30,000 maunds, valued at about two to two and half lacs of rupees; it is exported in the raw state to Calcutta, Jessore, and Midnapore.

19. Experiments have been twice tried with Virginia tobacco, *viz.*, in 1869-70 and in 1871-72. On the former occasion the seed appears to have been bad, for it did not germinate. In 1871, the seed was not received quite early enough to provide against the inevitable delay in distribution. Complaints were received from some places to the effect that the seed would not germinate, but this was probably the fault of the treatment, rather than of the seed. In the Koostea sub-division, the experimenters all found that the seed germinated, grew to the height of three inches, and then died. Baboo Ram Sunker Sen, Deputy Magistrate of Ranaghat, however, succeeded in raising a few plants, which were very healthy; he stated that the leaves were broader than those of country tobacco and possessed "greater stimulant power." I do not consider the experiments at all fatal to the prospect of acclimatizing American tobacco in this country.

20. I do not enclose the reports which I have received, because I have extracted from them all that can possibly be of use; I wish, however, to bring to your notice that for most of the information on which this report is founded, I am indebted to Baboo Dinonath Addy, Deputy Collector of Ranaghat.

*On the cultivation of Tobacco in the Jessore District. Communicated by A. SMITH, Esq., Collector of Jessore.*

With reference to your memo. No. 18 M. A., of 30th December 1873, I have the honor to submit the following replies

to the questions proposed by the Agricultural and Horticultural Society, on the cultivation of Tobacco in this district :

1st.—*What are the kinds of Tobacco, &c.*—The different kinds of tobacco grown here are the

(1) The Panbât.	(6.) The Hatikanah
(2) The Krishnakali.	(7) The Hingolia.
(3.) The Dakhinabaran.	(8) Kenta.
(4) The Dhalsa	(9) Kapipata.
(5.) The Hanumanjata.	

The last is considered the strongest tobacco. None of these kinds finds its way to Calcutta, the cultivation being limited in extent and confined to deserted homestead land and dung-heaps. A great deal of tobacco is imported into this District from Rungporé and Serajgunge, as the indigenous supply is quite inadequate to meet the local demand. The current market price is as follows :

2nd.— <i>Market price.</i> —Panbât	..	Rs. 8	p. standard md.
Krishnakali	..	6	” ”
Dakhinabaran	..	6	” ”
Dhalsa	..	3	” ”
Hanumanjata	..	8	” ”
Hatikanah	..	6-4	” ”
Hingolia	..	5-8	” ”
Kenta	..	7	” ”
Kapipata	..	8-12	” ”

3rd.—*Samples.*—I shall be glad to supply the Society with two maunds each of the Kapipata and Hanumanjata leaves, if they wish me to make the purchase.

4th.—*Descriptions of soil.*—The leaf is not cultivated in fields like other crops but on deserted homesteads, old decayed cow-dung heaps, and in heaps of old Indigo rubbish. When the leaf is ripe in March and April, the plant is cut and dried in the sun, and exposed to the dew at night; made up into small bundles, packed in straw, and put away for use or sale.

5th.—*Improvements.*—The present species are scarcely susceptible of improvement; and the soil, except in the North-western parts of the district, being low, is not well adapted to the growth of the leaf; experiments for introducing foreign seeds too, often fail, as either from being old they do not germinate, or are supplied too late in the season.

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CORRESPONDENCE AND SELECTIONS

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## Correspondence and Selections.

### BRANCHING PALMS.

Memorandum by Mr. J. Scott, Curator, Royal Botanical Garden.

I have much pleasure in communicating to the Society, the following notes by Dr. Beaumont, descriptive of a unique example of fasciation and branching in a date-palm—*Phoenix sylvestris*—with a very unstructive sketch of the same by Mrs. Daly, in whose garden the palm grows.

"This" says Dr. Beaumont "is a remarkably good sketch of a common date-palm in the Residency Garden, Indore. The trunk is 22 feet high to the lowest branch, and three feet six inches in girth at four feet from the ground. The branches are  $\frac{1}{2}$  in number; 18 of them rise vertically and are so closely packed that it was not possible to give a clearer idea of them in the picture.

"I have examined the tree and determined that it is really branched, and that the branched appearance is not owing to seeds having germinated in the axils of the leafstalks." Dr. Beaumont has here evidently in view an odd idea, first suggested by Mr. Edgeworth, and I observe adopted by Dr. Stewart in his "Punjab Plants." Thus under *Phoenix dactylifera*, he states, that at Múltán and several other places, there are some trees which appear to branch, the most remarkable, according to Edgeworth, being one close to the Kasbheri at Jhang, which is 12 feet high, with a branch of  $3\frac{1}{2}$  feet. These have by some been compared—and as I think correctly—to the Hyphæne or Doun Palm of Egypt; but I quite agree with Edgeworth that they merely result from seeds falling into and germinating in the axils of the petioles. Smaller specimens of such branches are not uncommon about Múltán, &c., generally growing near the top of the tree, whether the latter be short or tall.—*Punjab Plants*, p. 244.

The origin and nature of this ramose character in palms need scarcely be a matter for conjecture to any one who has seen the specimens. In these we have not to deal with vegetable structures annually increasing in thickness, as in the case of dicotyledonous plants, or the trees forming the bulk of our forests, in which the original points of union of branches are necessarily embedded.

or later, and externally indistinguishable from a true branch. In palms and their allies it is altogether different; they do not increase in thickness by the addition of annual layers in their circumference; hence that which has an external origin on them never can be embedded or afford grounds for doubt as to its mode of attachment or relation with the main trunk. Reflect on the epiphytic figs which germinate so frequently in the frond-axils of palms, sooner or later investing as in a sheath the whole trunk, and ultimately strangling its supporter; yet throughout, while the two exist, there never can be a doubt as to their relations. Infinitely less feasible is it to expect to find such in the case of palm seeds germinating in the axils of fronds, if indeed, such a phenomena ever occurs, and which I very much doubt, even in the moistest and most equable of tropical climates, far less the extreme climate of the Punjab. I speak from some little experience in palms of many kinds, and I certainly never have seen anything of the sort as it appears to me a seedling palm, springing up in the axils of a date frond could neither fix its roots therein, nor find nourishment for many days beyond the period in which that stored in the seed was exhausted.

I take this opportunity of noting a few cases of palms which have produced branches near Calcutta, and for the knowledge of which I am chiefly indebted to the native overseer of this garden, Babu P. C. Sein—1. *Phoenix sylvestris*. A large specimen of this palm, near Oolobarah, had a tall erect stem, branching irregularly at a considerable height into seven distinct and well-developed heads. This specimen was uprooted and destroyed by the cyclone of 1864. A second specimen of this palm at Sookhchur, near Barrackpore, of a smaller size had also six lateral branches over-topped with the main crown. This specimen seems also to have been uprooted by the cyclone. I have accounts of other less numerous branched specimens, but I can hear of none of this palm now existing in the vicinity of Calcutta.

2.—*Cocos nucifera*,—the Cocoa-nut tree. A most interesting example of branching in this palm was illustrated by a large specimen in the garden of Babu Luckinarrain Dutt. This tree was about twenty-five feet in height and had five well-developed, fruit-bearing heads. It was held in great veneration by the Hindoos, and annually, about the time of the Moonah Poojah, flowers, fruit, rice, and were scattered around its roots by the many Hindoos who then gathered there. The late Dr. Falconer tried in vain to purchase the specimen, and I hear that he sent a native from this garden to meet

sure it carefully, but he does not appear to have anywhere recorded these. As in the case of the date-palms this specimen was also broken and up-rooted by the cyclone of 1864. I have just heard that a two-headed cocoa nut palm, may be seen in the garden of Ghosal Babu, at a short distance from the Coochpur Station, on the East Indian Railway.

*Tobacco its cultivation and preparation, in the Phillippine Islands By DON RAFAEL ZARAGOZA, Principal Appraiser and Chief of the Government Tobacco Department*

[Translated for the Government of India, in the Department of Agriculture, Revenue, and Commerce by J. L. O'CONNOR.]

I wish to prepare this treatise with some method and as clearly and concisely as possible, in order to avoid misunderstanding in a matter embracing so many details, all of the greatest importance. I will divide it therefore, into four heads, or chapters. In the first, I shall treat of the various classes of soils adapted to the growth of tobacco, of their preparation for the sowing of the seed, and of other matters connected therewith. The second will be devoted to the nurseries for the seedlings. The third will set forth the mode of cultivating the tobacco plant, and will show when the leaves are fit to be plucked for curing. And the fourth will treat of the curing and the further manufacturing operations necessary until the leaf reaches the condition in which it is accepted by the Government Department.

*I—Of the various classes of soil adapted to the growth of Tobacco.*

Four distinct classes of soil are recognised as being adapted to the cultivation of tobacco, some being superior to the others. The first are the *bacoranes*, or high lands, and lands lying at a distance from rivers; secondly, newly-cleared woodland; thirdly, moderately high land lying close to rivers, or forming their banks, and known among tobacco-planters as *tomamas altas*; fourthly and lastly, plains and low-lying lands, called by the same class of persons *tomamas bajas*, those which are most fitted for tobacco, producing the tallest and most vigorous plants, the leaves of which are almost all of the first class and full of juice, of fine taste and colour, are the lands last mentioned, and next to these come the river lands and newly-cleared woodlands. The *bacoranes* or high lands are the most fit

the sowing of tobacco, because in order to obtain even a moderate harvest yielding profit to the owners, the land must be well manured every year, and the seed sown with great care. The manure most generally used by cultivators consists of maize-stalks left to rot in the ground. All kinds of dung are also used when maize-stalks are not to be had, but, more especially, the dung of oxen and buffaloes, as being most abundant and as hardly requiring any measurement to regulate its proportion to the soil. The operation is effected by thoroughly mixing the dung with the earth by means of a plough.

Low-lying lands require no manure. They receive the benefit of manure without any artificial aid when they are inundated by the great and continued rise in the rivers during the rainy season. The alluvial deposit brought down by the floods and spread over these lands during the freshes forms the best manure for tobacco or any other plant, not only because the earth is easily tilled after the subsidence of the waters, but also because it greatly nourishes and fertilizes the soil, so that the roots of the tobacco can strike down and extend in all directions with perfect ease. In respect to the mode of cultivation, cropping, and curing, all these soils stand, with but little difference, on the same footing. In all, it is generally necessary to plough the ground well, and as deeply as possible, in order to turn up the earth and move it as much as possible, so that it may receive the beneficial influence of the air, and it should be kept as clear as possible from weeds and roots. To this end, it is ploughed four or five, or more times (with equal strength on each occasion), according to the quality of the soil. The cultivator being satisfied that the ploughing has been thoroughly done, and that there is no fear of grass or weeds remaining in the ground to spring up and kill the tobacco, should do his best to refine his work, working the earth up fine as much as possible, and as it were pulverizing it, by means of comb-rakes or other similar agricultural implements. The result of this operation, which should be repeated as often as necessary, is, that the soil becomes perfectly equal and fine, and it is especially essential in order that the young plants when put in may have the opportunity of springing up equally and may be enabled to grow vigorously. This, however, cannot be done, it is evident, while the earth is wet. It is necessary that it should be well seasoned, aired, and almost dry, and in order to obtain this condition, it is desirable that five or six days, or more, should be allowed to intervene between one ploughing and another if the humidity of the soil is great, so that the heat of the sun may

remove the conditi which is so prejudicial to the plant.

The most convenient hours, and those in which most work can be done with least fatigue, both by the labourer and the plough-cattle, are from 4 to 8, or at latest 9 in the morning, and from 4 to 8 in the evening. When the moon is up, the whole night may be occupied in ploughing, for this is unquestionably the time when work can be done with least fatigue, especially by the buffalo, which is but ill able to stand the effects of the sun.

This animal costs, ordinarily, when good, from 15 to 20 dollars, and when in middling condition, from 8 to 10. A labourer and buffalo together will plough, during the hours mentioned, a field of 240 feet square, and more, if worked during the night as said above.

Soils consist of two classes in regard to preparation, *i. e.*, high and low, and their preparation is effected at two different periods, *vis*, from the month of August to the end of October for the first, and from September to the end of November for the second.

## *II—Of the Nurseries.*

The best preparation of the soil will be of no use, unless the planter has at hand a nursery of young strong plants, full of life, and ready to respond vigorously to his labour, care, and fatigue. For the formation of the nursery, the finest and healthiest seed should first be selected. It should be taken from a certain number of the best, strongest, and most vigorous plants, which should be marked for selection at the period of cropping. These plants should not be cropped, and they should not be touched except to strip off the leaves immediately next to the top. These plants should be reserved for the production of the seed required for the purpose of beginning the plantation. If the planter is careful to see to such a selection of seed, and it is the chief foundation for a happy result of his labours, he will find himself in possession of as fine and healthy a nursery as he could desire.

The reaping of the seed is such a simple and obvious operation, that it is unnecessary to describe it at any length. Crop the fruit at the proper season, that is, when the flower has fallen off and the capsule assumes a dark colour; dry the fruit in the sun, in order to extract the seed with more facility and to free it at the same time from any humidity which in this state of the seed might prove very pernicious; and lastly, extract the seed from the capsule and place it in jars or other convenient receptacles which should be kept in a kitchen or any other place equally dry, in order to pre-

serve it from humidity. In this way, the seed may be preserved in good condition until it is required.

There are four kinds of seed—the *Pampango*, the *Mimutaca*, *Hinolitva* or *Isinay*, and the *Qagayan* or *Corazon*; the three first are those which are regularly used in the district of Nueva Ecija, much less use being made of the *Hinolitva* or *Isinay* than of the other two, because it produces narrow leaves of bad quality; the fourth kind is used in the district of Corazon where it is indigenous. It produces large broad leaves of good quality, and is, therefore, most esteemed by cultivators.

When it is desired to sow the seed, some prepare it by steeping it for twenty-four hours, others wash the seed and then air it in a coarse cloth, in order to get rid of the gum, or juice, attaching to its exterior, this object being considered attained when the water used in washing the seed ceases to be discoloured. All this is utterly useless, for the plant germinates without fail in five or six days without the aid of any of these preparatory operations, so that the seed may be sown with the certainty of good effect if the ground has been duly prepared.

High lands should be chosen for the nurseries, so that they may not run the risk of being inundated when the floods come down; they should also be free from shade. This precaution will prevent the occurrence of debility or delicacy in the young plant, for if it is not taken, the plant will infallibly die when being transplanted. The nursery should also be set up close to the house of the cultivator, so that it may conveniently receive with little trouble all the care necessary to bring it to perfection. It should form an oblong or a square large enough for double the number of plants which will be required for the plantation, in order to provide against failures, which are always numerous; the nursery, therefore, should be constructed of such size as may appear to the cultivator to be convenient. It will probably be found sufficient in any case to have it forty feet long and as many wide. A ditch should be dug all round, the earth within the ditch being raised as much as possible. The earth should be well ploughed up, the soil being even pulverized, if possible, and manured, if necessary, with some sort of very dry dung. If the width of the ground exceeds six feet, it should be divided into beds or divisions separated from each other by small drains running from side to side of the nursery with the object of preventing rain water, or the water used for irrigation, from lodging in excess in the ground. Excessive lodgment of water would cause the

## *Tobacco in the Philippines*

rootlets of the young plants to rot, and would not succeed, if there was much in the ground, when it was sown. This class of nurseries set up on level ground and loose soil, is well adapted for transplantations to low-lying lands by reason of the similarity in the quality of both kinds of land. This circumstance should be carefully noted, because the seedlings, when transplanted to such soil, strike easily and grow vigorously; whereas they would not succeed if put into strong and compact soil for the simple reason that they have not sufficient strength to penetrate deeply and spread their roots, and the result would be that they would grow up weakly or die. Other kinds of precaution are to be taken when nurseries are formed on high lands, where the soil is heavy and clayey. Nurseries in such localities are generally set up in woods, not only with the object of suiting the land to that to which the seedlings have to be transplanted, but also because there is a good proportion in them of declivities, broken and sloping ground,—a matter of importance in connection with the object indicated, because the cultivator is saved the necessity of making drains, for in such places the waters brought down by the heavy rains do not remain to injure and kill the seedlings. But as the soils to which the seedlings have to be transplanted are of two classes, as already said, having regard to their position, it is necessary also to have two kinds of nurseries, one prepared from the month of June to the end of August, which is the time when the seed intended for high land is sown, and another for the low lands, commencing from the next month (July) and ending in September, at which period the same operation is performed in these lands. But as the same care and attention are required for both, with very little difference, they have been combined in this pamphlet in order to avoid repetition and prolixity.

The ground intended for the seed being now prepared, well cleaned, well pulverized (worked up), elevated about a hand's breadth above the level of the rest of the soil, and its area divided, if necessary, in the manner already pointed out by means of the little drains, the seed is sown in the months specified; the ground being moderately moist, for when dry, the seed cannot be sown. To sow the seed properly, it should be mixed with very dry and fine sand or ashes, so that the seed shall be regularly and proportionately spaced out and not heaped up together in some places, and extremely thinly laid in others, which is just what would happen, if this precaution were not observed. Of the two mixtures, viz., sand and ashes, ashes are preferable, because they prevent ants from destroy-



ing the seed, which has to be sown almost on a level with the surface.

The seed of tobacco being so extremely fine and subtle, it is necessary that it should be sown, in the manner just described, in earth almost pulverized and at no greater depth than barely a line and-a-half from the surface. To obtain this result the soil is strewn carefully and gradually over the seed the depth of which has to be regulated in this way. If this is not done, the seed will not germinate, for the fibres of the plant are so delicate in the stalk as well as the root that, unless it can reach the open air at once, it is speedily stifled and rots.

It is at this stage of his work that the planter should redouble his care and watchfulness, taking special precautions against the heat of the sun and heavy showers of rain, either of which would in a moment destroy the whole of his work, if they reached the plant at this early period. To avoid these evils, some, to guard against rain, shelter the nursery under a covering of palm leaves, or other like material. But to protect the seedlings from the heat of the sun, it is necessary to water the tender plants morning and evening by hand, with the greatest care at first, for, if the watering should be done violently, the seed is destroyed, or the little sprouts, just showing above ground, are beaten down. Once the plants attain sufficient strength, that is to say when they reach the height of two inches, such extreme and particular care is no longer necessary, it is sufficient to keep the nursery absolutely free from all weeds and grass for it is evident that the quality of tobacco cultivated in the midst of grass and weeds must greatly degenerate. It will always be necessary, however, to inspect the nursery from time to time, in case the rains should fail and the sun become oppressive, as also to see whether there is any tendency to disease or feebleness among the seedlings. If any of them should be found to be sickly or weakly, they should be gently rooted up and removed, in order to prevent their infecting the others, which would irremediably happen, if this precaution were not taken.

If it should happen too in any of the beds, as the result of any carelessness on the part of the planter, that the plants are either too close together or too far apart, and debility should consequently manifest itself, some of the plants should be removed as gently as possible in order to leave sufficient room for development to the others that remain.

In well managed nurseries the plants are fit to be transplanted

after the sixth week, but in no case should the eighth week be exceeded. Until the seedlings are six weeks old, they have not sufficient vigour to strike their roots in soil which is strange to them, and after the eighth week the roots attain such a size that the tap root is liable to be injured in the act of removal.

When the transplantation is about to be effected, it will be necessary if the weather has been unusually dry, to cause the earth to be watered with the object of effecting the removal of the seedlings as gently and easily as possible so as not to injure in any way the roots which have to strike into the new ground intended for them. For purposes of transplantation the most luxuriant and hopeful-looking plants should be selected. The operation should be performed between 5 and 9 o'clock in the morning and 3 to 6 in the evening and during the night if it should be clear. It is always best that the transplanting should be carried out at these times, because the seedlings are thus enabled to benefit by the humidity and freshness of the night and the early morning, and receive strength and vigour to resist the heat of the sun.

### *III—Of transplantation and further cultivation*

When the nurseries are sufficiently advanced for transplanting operations to commence the state of affairs should be looked to without delay in order that the season during which the seedlings remain fit to be transplanted may not pass. For as already said, when the plant becomes too large it is with difficulty that it can be removed without injury to the main root and the smaller roots accompanying it. If this should happen although the plant should take well at first it will always show considerable backwardness in its ultimate growth and physical constitution the resources given by nature to bring it to perfection being numbed and paralysed.

We will suppose that the ground to which the plants are to be transplanted has been prepared with all the care and exactness explained in the second chapter. This being so the healthiest plants in the nursery are taken out as gently as possible, the operation being performed with a pointed little cane supported by the hand the cane being inserted to a sufficient depth in the soil immediately around the plant the point or inferior extremity is directed towards the root while the hand slightly aids the pressure at top and the plant is removed without having suffered the slightest injury its main root being accompanied by some of the soil. This will be extremely beneficial to the seedling if the plant is

transplanted at once, but if not, it will be prejudicial, as the humidity of the earth dries up and disappears, the result being that the root is also by the caking of the dry earth deprived of the benefit to be derived from the fresh moist earth into which it is put.

When a sufficient number of seedlings has been taken up to give employment for a day's work during the hours already indicated, they should be put together with the greatest care in a basket, to be kept ready for the purpose, and being covered with plantain leaves (which are naturally fresh), or other similar material, should be taken to the spot destined for their reception. This is the time for the preparation of the furrows, and as the laborer proceeds with his buffaloes and plough making them, he should plough very deep if the soil is clayey and heavy, but lightly if the soil is light and loose, such as the soils of low lying river lands. The son or wife of the planter, or some other person, now follows and puts down the plants in the furrows, a yard away from each other in low and fertile lands, and three quarters of a yard in high lands, always taking care to leave lateral and transverse rows into which the plough may be subsequently introduced, as will be shown presently as well as with the object of preventing the leaves from rubbing against and covering each other the result of which would be that the young shoot would be injured as they sprouted, or that the plants would remain deprived of the sun's rays, which are extremely beneficial especially before sprouting begins. The plants being thus spaced out in their furrows another man follows carefully tanning them with his left hand and a pointed cane or a small kind of trowel (some, however, use merely the fore finger and thumb of the right hand forming with them a cavity sufficient to embrace the whole height of the seedling), clearing and bringing above the soil any of the leaves of the plant that may have become covered with the earth taking care that the roots be straight and not doubled up, and that there is no defect anywhere, because if this were the case there would be great probability of the plant not coming to maturity or at least of its being infirm and unhealthy.

The plants being thus placed in their respective positions in the order and at the distances specified, the next operation is that of irrigation, this being the more necessary if the ground is of a tolerably dry character, and is dry at the time of transplanting. Care should be taken, however, that the water does not fall upon or touch the leaves, not only because on account of their tenderness

they would be injured, but also because the weight of the water might be sufficient to break the plant.

It is now of the first importance to raise a sort of bank on either side of the plants, one on the side where the sun rises, and the other on the opposite side, with the object of preventing the plants from suffering the whole day from the heat of the sun, which would otherwise be sensibly felt.

The transplanting and other operations specified being finished, care should be taken to replace any plants that may have accidentally perished, in order to keep the rows uniform and exact with an equal number of plants in each, and that space may not be lost unprofitably. The replacement should be effected as speedily as possible so that the whole of the plants should grow equally in size and luxuriance.

When it becomes apparent that the plants are thoroughly rooted in the ground, and they are seen to have become vigorous and flourishing which ordinarily will be within about three weeks after planting out they should be earthed up, plenty of earth being heaped up the bottom of each plant to give it greater support, and at the same time the planter should begin to redouble his vigilance in keeping the ground perfectly clear of all grass or other vegetation which may have sprung up between the plants.

The most effectual way of carrying out both objects will be to repeat the ploughing, making use of the lateral rows for the purpose and still more to the same. The ploughing should be done with the greatest care and intelligence, buffaloes being used for the work, and no plant should be omitted from the operation. If after the ploughing it is found that the earth has not been properly massed up at the foot of an plant or plants, the hoe may be employed with good effect to remedy the omission. Within a few days after the completion of this work begin the troubles of the planter with worms and grubs. His labor in eradicating these must be incessant. At sunset and in the early morning up to eight o'clock, he must occupy himself in the painful task of removing these insects, one by one plant by plant. This is the greatest fatigue the planter has to undergo and the cruellest plague of the tobacco plant. These worms attack the finest plant, by a fatal instinct they choose the largest and most healthy plants, those which are fullest of sap, that is to say, those which ought to be the pride of the plantation. The greatest care and diligence applied to the extermination of this pernicious vermin are little less than useless,

or plantain leaves (the latter being very much preferable on account of their natural freshness), to preserve them from the sun. They now only require to dry a little, so that the leaves may be found flexible and easy to work in the operations remaining to be performed.

The carts being brought to the drying room, the leaves are placed upon the floor. This should be kept particularly free from dust, and, as a greater precaution, it should be covered with plantain leaves, in order that no dust whatever may be taken up with the tobacco when it is hung up to dry in the air.

Many planters cure the tobacco in their own houses, but the practice is inconvenient, and is even prejudicial, because, their houses being as a rule very small, the leaves are crowded together and even collected and hung up outside the houses, the result being that they are rendered useless, or filled with defects, which detract greatly from the quality of the tobacco; for, in the one case, the necessary abundance of ventilation cannot be obtained, and, in the other, the leaves that are hung up outside the house are covered with mould, black and green spots, and are otherwise affected in a most injurious way.

The cost of a drying room, 15 to 20 yards in length and 8 to 10 in breadth, these dimensions being sufficient for the crop of a moderate sized plantation sufficient for the wants of a married man, is very small, seeing that the materials cost next to nothing by reason of the proximity of the woods whence the timber, reeds, canes, and other requisites are found in abundance. The total cost of construction will probably approximate to 15 or 20 dollars. This being the case, and the existence of the shed being, as will be shown, of the greatest use to the tobacco, all planters should make it a rule to have such sheds constructed, and should wholly abandon the fatal custom of curing such delicate leaves in their own houses.

The leaves should be arranged on the floors of the drying house in the manner in which they were arranged in the cart, *i. e.*, preperpendicularly and with the stalk-end of the leaf downwards. This precaution is of great benefit to the tobacco and should be carefully observed.

This being done, and done without delay, the tobacco should be strung up, or, which is the same thing, the leaves should be run on to thin sticks, each about half a yard in length, the leaves being about half an inch apart from each other, so that they may be waved about in the breeze, and thoroughly and equally receive the benefit of the ventilation. If this is not done, the leaves will not

only become covered with green spots, which will give the tobacco a disagreeable flavour, but they will also turn out sickly and with a disposition speedily to rot.

The leaves being thus arranged on their drying-rods, these are raised and supported on canes running from side to side of the shed at a distance of a quarter of a yard from each other.

During the drying, great attention should be paid to the state of the weather, because if it is raining and consequently very damp, in place of receiving the drying desired, the leaf becomes impregnated with moisture, and is covered with mould, capable of destroying its principal qualities, such as its gun, its elasticity, its natural consistency, &c. Any leaves that may have been exposed to damage of this kind should be cleaned either with a cloth or some other suitable material.

The drying of small tobacco lasts ordinarily for about fifteen or twenty days, and of the large tobacco or that of the best kinds, from twenty-five to thirty. In this period it will become thoroughly dry and ready to be taken down, this should be done with sufficient care to prevent any injury to the leaf. If the weather is unfavorable, that is, if there has been excessive rain and the tobacco is consequently moist and excessively flexible, the operation of taking down should be deferred until the dampness of the atmosphere gives place to dryness and heat. The planter should take care only to remove the dry leaves, for the slightest negligence here in making up his piles of tobacco by the introduction of damp leaves, is certain to cause fermentation which will spread and destroy the whole pile. He must therefore, if he wishes to avoid certain loss, in no way relax his vigilance here.

The leaves being taken down are next carefully cleaned of all dust they may contain and are doubled down lengthways, all wrinkles in the leaves being at the time smoothed down. The strings of leaves are then made up into bundles of convenient size regularly and uniformly, no apertures or inequalities being allowed in the bundle. The bundles should be turned over every six days, for if left to stand without turning, instead of the mild fermentation necessary to bring tobacco to perfection, excessive fermentation will speedily set in in the lower part of the bundles, owing to the weight of the leaves on top of them and the absence of all ventilation. This operation of turning over the bundles of tobacco should be performed three or four times, or oftener if the piles are very large, for in proportion to the increase in the quantity of freshly-cured

tobacco is the increase in the degree and rapidity of fermentation

If the tobacco should now be found to have undergone any fermentation, the bundles should be undone, and others made with the same precautions and of the same size as the first, care being taken to turn these too upside down though this may now be done at less frequent intervals, it being sufficient to turn them once in ten days.

These curing operations last for twenty days or sometimes more, and at the end of that time the small sticks on which the leaves are strung are replaced by other still finer or by very thin reeds the object being to have the sticks so fine that when the bundles are tightly made up the sticks being very thin will not be likely to injure the leaves above and below them on which owing to the tight packing they must necessarily press somewhat. It is understood of course that the thin sticks by which the first lot are replaced are of a sufficient length to receive the number of leaves sufficient to make up the quantity prescribed for a hand according to the class of tobacco. Formerly the sticks were made so short that they could only hold the tenth part of the number of leaves required so that to make up the hand ten of these had to be placed one over the other and bound up together with cord or plantain fibre or some similar material which had to be run through the leaves to their dining but this system has been replaced by the one explained above. The tobacco having arrived at this stage, the planter should pick it up not omitting to turn it over from time to time. It remains in this condition until it has received all the curing necessary a fact which becomes apparent by the change of colour of the leaf to dark chestnut. The tobacco is then taken to the offices of the Government appraisers to be measured and valued.

Free exposure to the air is the most important thing required to turn the tobacco out well. At the same time however if the planter is idle or careless and omits the most or the principal of the operations indicated he will lose the fruit of his labours.

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## Appendix I.

### *Regarding the treatment to be applied to the new shoots or suckers of the Tobacco Plant in order to utilize their leaves.*

As the treatment to be applied to some of these shoots is interesting and useful, seeing that they produce good and useful tobacco, I consider that it will not be superfluous to explain it as clearly and fully as I can. This is the treatment: The stalk having been entirely denuded of the leaves left after the cropping effected by the planter, as already noted before, two only of the many shoots that spring out everywhere from the point of junction of the leaves with the stalk should be now allowed to remain. The shoots to be selected for this object, as giving the best results, are those which make their appearance nearest the ground, but as the leaving of two shoots at this part of the stalk would have a bad result in the too close proximity to each other of the leaves, hindering and obstructing each other in their development, one shoot only should be left at the foot of the plant, and the other about nine inches or a foot higher up. The leaves will thus profit all the better by the effects of the sun, dew, and free ventilation, all of which, as already said, are of great benefit to them.

The two shoots being chosen in the places indicated, all others which may be making their appearance on the stalk are removed, and the stalk is cut away above the topmost shoot reserved. The cutting is effected by means of a sharp knife, called by the Indians *bolo*; this is grasped in the right hand, the stalk is held in the left to prevent its moving in any way, and the blow is given diagonally downwards. It has been repeatedly observed, however, that it is better not to cut the stalk away altogether, but merely to take care to nip off the unnecessary shoots as they show themselves, because no matter how well the cutting is done, the roots always suffer from the movement communicated to them in the operation. It has been frequently found that plants droop away altogether after their stalks have been thus cut down.

The next thing to be done is to clear away all the dry earth accumulated round the foot of the plant, and replace it with other fresh and moist earth, in order to vivify the plant and make it less sensible of the forcing and prolongation of its vegetation. These oper-



ations hasten the growth of the shoots, and make them reach maturity without delay. In ten or twelve days the leaves will be ready to be plucked, the fact being ascertained in the same way as with the first production, the only difference being that each shoot produces only five leaves at most, not being able to bear more on account of the length of time the plant has been left to bear; this delay also causes the production of short leaves only yielding third class tobacco, unless great care has been bestowed on them and the weather has been favourable. These conditions being present, however, and when the plant has been of good quality, it has frequently been found that the second shoots produce leaves as good as those of the first:

The leaves plucked from these second shoots are very easily known. The sides of the leaf separated by the midrib are not of equal width—one being much wider than the other; the midrib is thinner than in leaves of the first crop, and the leaf is much more pointed.

As the cutting and curing of this kind of tobacco are in every respect similar to the processes adopted with tobacco of the first crop, I shall not repeat the description here. Nothing more remaining to be said on any of these heads, I finish my paper here, and pass on to explain in the following appendix the diseases and injuries to which the tobacco plant is liable.

## Appendix II.

### *On the commoner diseases of Tobacco, and their causes.*

While the tobacco is in the ground, it is subject to many diseases and accidents, all of which affect its quality injuriously, though some do so in greater degree than others. Planters generally agree as to the causes of these diseases, and their opinions are confirmed by the observations made by myself during the long time I have devoted to the study of the plant itself in the various district plantations under the management of the department. In this paper I shall speak of them with perfect knowledge and without any fear of being wrong.

The first infirmity or defect which occurs to me is that where the tobacco takes a yellowish, or golden colour; this is called by the planters *galad*. Three causes produce this result: the first is a superabundance of sand in the soil, which deprives it of the fertility and substance so necessary for the plant, burning up the tap-root

and the others accompanying it, the result being that the plant rots and assumes a miserable aspect. The leaves produced are very small in size, not being superior to the fifth class in this respect; they are poor in body, juice, and elasticity, and are of a bitter taste.

The second source of this disease arises from excessive humidity in the ground in which the plant exists. This humidity causes the main and other roots to be languid in developing vegetation and unable, consequently, to communicate to the leaves the juice and thickness they ought to have. The result is, that the leaves are as worthless as the others just spoken of. they are yellowish, long, and have no body.

The third and last source is the sun which burns up the leaves when through the carelessness of the planter they are placed close to the doors of the curing room, or kept outside the houses. The result of this is that the leaves turn of a reddish colour, but an accident of this kind does not substantially affect the leaves which retain the good or bad qualities they possessed at the beginning.

*White spots.*—This defect is occasioned by excessive rain falling upon the plant when it is close upon maturity. Such showers wash down the leaf, remove all its gum, and cover it with spots of this colour, which are originated by the strength of the sun drying up all the drops of water resting on the leaf and burning the leaf in those places. If the showers have been light, however, no harm results, and none of the gum is extracted, especially if the leaf possesses the body and sap which are characteristic of it.

*Green spots, or Pintulo, as the planters call them.*—This disease arises from three causes. The first is the occurrence of one or two rainy days just before the leaf is ready to be cut. In this case the planter should take the precaution of keeping the plant for three, four, or five days more in the ground, in view to its recovering from the soil the gum washed off the leaves by the rain.

The second cause is the cutting of the leaves in the early morning when they are covered with the dew of the past night.

And the third is the sticking together of two leaves when they are run on sticks and hung up to the air in the drying room. In this condition of adherence the leaves cannot receive proper ventilation, which is of the first necessity. Tobacco thus affected, in consequence of carelessness of this kind and that above mentioned, on the part of the owners, suffers from these green spots, which cause it wholly to lose the body and juice which it had originally, and reduce it to a very inferior quality.

*Tobacco out of season;* or *Mula* (dumb) tobacco, as it is called by the planters.—This is known when, after all the curing necessary has been finished, the leaf is found to be very thin and without the body and juice which it should have to give the planter the reward of his toilsome labours. It is clear and certain that tobacco, like all other plants and fruits, when cropped out of season and before it has reached perfect maturity, cannot possibly possess the flavour and juice which make it agreeable and useful for the object in view.

*Black spots,* or *Boog*, according to the expression used by the planters.—This disease is the result of the negligence and idleness of the owners when they postpone the stringing up and airing of the leaves after they have been cut, leaving them to lie in piles on the floor of the drying room for three or four days before hanging them up. The result, of course, is that the heat generated in the leaves when they lie in masses in this condition, produces these black spots which soon spread irremediably over the leaves, destroying and rotting them.

*Burnt Tobacco,* or *Sutio*, according to the planters.—This name is applied to tobacco which has fermented excessively while piled up during the process of curing, and is the result of want of care on the part of those interested in neglecting to move the bundles about and turn them upside down, and in not keeping them in a room with a window on either side for the proper ventilation of the leaf. If the tobacco is found extremely burnt up, or turning black, it is wholly useless for any purpose. But if this is not the case, that is, if the evil has been discovered in its commencement (the fact being known by the whole of the leaf not having as yet turned black) it may be utilized for consumption if sent out as promptly as possible.

*Llvido* tobacco, that is, tobacco that has been rained upon, is a name applied to tobacco which, when beginning to be ready to be cut, has been rained upon day after day, and at different periods, before it has arrived at perfect maturity. The result of this is that the leaves are deprived of all their gum and are covered with earth, losing all their good qualities and consequently becoming unfit for useful purpose.

*The 24th May, 1859.*

DAVID BANCROFT'S American Seeds received from Agri.-Horti. Society, in tin, and 50 Seeds of each kind sown on September 17.		VILMORIN ANDRIEU'S French Seeds received from Agri.-Horti. Society, in tin, and 40 Seeds of each kind sown on Oct. 22.	
NAMES.	No. of Plants raised.	NAMES.	No. of Plants raised.
Large late Cauliflower ...	41.	Celery purple Giant ..	29.
Early Asiatic do. ...	35.	Do. white do. ..	27.
Purple Cape Broccoli ..	26.	Walcheren Broccoli ...	19.
Brussels Sprouts ...	42.	Early esprit Cauliflowers	8
Early Sugar-loaf Cabbage ..	38.	Half-early Paris do. ...	12.
Early Flat Dutch do. ...	34.	Broccoli Cabbage ..	23.
Red Dutch do. ...	32.	Winningsstadt do. ...	18.
Purple Knol-khol .	31.	Carrot early shoot ..	32.
Early York Cabbage	37.	Do. half long Nantes ...	28.
Long Orange Carrot .	37.	Lettuce-leaved Spinach ..	19.
Early scarlet Horn do. .	34.	Olive-shaped Radish .	27.
Large Globe Artichoke	10.	Early scarlet Turnip do. ..	36.
Curled Parsley .	8.	Dark-red rough skin Beet ..	40.
Trophy Tomato ...	39.	Red Tankard Turnip .	36.
Hubbard Squash .	7.	Red Amerique do. ..	33.
Yellow Stranburg Onion ...	40.	Sweedish do. ..	22.
Yellow Aberdeen Turnip ...	37.	Green Paris Co.'s Lettuce ...	31.
Early Flat Dutch Turnip ..	43.	Crisp German do. ...	29.
Solid Celery ..	31.	Parsley ...	8.
Scarlet Turnip Radish ..	36.	Thyme ...	9.
White do. do. ...	31.	Sage ...	17.
Turnip-rooted Beet ...	48.	Cucumber ...	6.
Cabbage Lettuce ...	23.	Tomato, red ..	23.
White Co.'s Lettuce ..	9.	Pear-shaped Tomato ...	18.
		Silver-skin Onion ...	11.
		Flag Leek ...	7.
Total Seeds sown .. 1,166		Total Seeds sown .. 1,010	
Total Plants raised .. 731		Total Plants raised .. 568	

Table showing result of sowing of English, American, and French Seeds, 100 seeds of each kind, sown on October 23rd.

NAMES.	BARR & STODEN'S SEEDS RECEIVED		AMERICAN SEED RECEIVED FROM SOCIETY IN TIN ON THE.		French seeds received from Society in tin October 22nd.
	24th May, in paper and col silk.	Intin, opened Sept. 1st	11th July.	17th September.	
Cabbages, of sorts	82.	58.	72.	67.	42.
Cauliflowers, of sorts	81.	81.	None sown	77.	26.
Savoy Cabbages	91.	89.	None sown	None sown	None sown
Broccoli	58.	30	18	52.	46.
Knol-khol	89.	None sown	57.	78.	None sown
Beet	91.	86.	39.	92.	92.
Lettuce	59.	52	22.	33.	61.
Parsley	61.	49.	12.	16.	19.
Turnips	87.	None sown	79.	82.	66.
Carrot	79.	65.	61.	72.	76.
Celery	82	69.	63.	71.	73.
Radish	91.	None sown	67.	76.	79.
Tomato	89.	None sown	79.	80.	59.
Cucumber, 50 seeds	40.	46.	42.	43.	31.
Squashes and Marrow seeds	36.	32.	35.	36.	None sown
Total Seeds sown	1,500	1,100	1,300	1,400	1,200
Total Plants raised	1,119	666	646	875	670

*Seeds from BARR and SUGDEN, received May 24th, packed in brown paper and Oil Silk.*

NAMES.	20 SEEDS SOWN 24TH MAY.		40 SEEDS SOWN 28TH JULY.	
	No. of Plants raised.		No. of Plants raised.	
Lemaitre's short-stem Cauliflower	...	14	34	
Lemonmand's do. do.	...	9	18	
Paris Market do.	..	13	35	
Covent Garden early do.	...	14	30	
Nuicker-bocker do.	...	17	34	
Walcherin Broccoli	..	16	35	
Batterlea Cabbage	.	15	30	
Enfield Market do.	.	15	35	
Dwarf York do.	.	16	38	
Sugar Loaf do.	...	14	26	
Winningsstadt do.	...	8	21	
London Market do.	..	17	36	
Drumhead Savoy do.		16	38	
Golden Savoy do.	..	15	32	
Pancalier Tanler Savoy do.	..	9	24	
Early purple Vienna Knol-khol	.	9	37	
Early white Vienna Knol-khol	...	10	34	
Poley's non-such Turnip	...	15	36	
Henderson's Beet	...	20	31	
Lobjoit's Beet	.	20	39	
Barr's Improved Beet	...	20	36	
Borth Co.'s Lettuce	...	10	29	
Wyatt Co.'s Lettuce	...	9	24	
Covent Garden Winter Co.'s do.	...	11	21	
Covent Garden Summer Co.'s do.	...	10	29	

*Seeds from BARR and SUGDEN.*—(Concluded.)

NAMES.	20 SEEDS SOWN 24TH MAY.	40 SEEDS SOWN 28TH JULY.
	No. of Plants raised.	No. of Plants raised.
Covent Garden Summer Co.'s Cabbage Lettuce ...	12	27
Bedfordshire Champion Onion ...	Not sown.	18
Madiera Santa Anna Onion .	...	16
Tripoli early white Onion ...	...	17
Covent Garden Snowball Turnip .	.	39
American red Straphaf do. ...	..	33
Covent Garden Improved Beet ...	...	40
Blood-red Beet ...	...	40
Champion Moss-curled Parsley ...	...	22
New early Flander Carrot ...	...	40
Attringham do. ...	..	37
Covent Garden Surrey do. ...	...	40
New Zealand Spinach .	...	28
Giant Orach do. ...	...	21
Round Flander do. ..	..	18
Incomparable White Celery ..	...	31
Wandless Immable do. .	..	20
Covent Garden Celery ...	...	31
Dixon's Marmoth do. ..	..	33
Sweet Spanish Capsicum ..	...	31
Tomato do. large .	...	37
Red Italian Tomato .	...	36
Rose Round-about blanc Radish ..	...	10
White Turnip Radish ...	...	34
Scarlet do. do. ...	...	31

Total number of Seeds sown to May  
Do. Plants raised

520  
854

Total number of Seeds sown in July  
Do. Plants raised

12,000  
1,528

*Seeds received packed in Tin.*

*D. LANDRETH'S from Agri-Horti Society on July 11th and sown same day.*

*BAKER & SUGDEN'S received May 24th, opened and sown 1st September.*

NAMES.	No. of Seeds sown	No. of Plants raised	NAMES.	No. of Seeds sown	No. of Plants raised.
White Round Radish	10	29	Enfield Market Cabbage	50	18
Red do. de. ...	...	25	Dwarf Early York do.	...	32
Dutch Turnip	...	36	Winningstadt	...	17
York Cabbage	...	29	Drumhead Savoy	...	15
Drumhead do.	...	27	C. G. Early London Cauliflower	...	41
Sugar Loaf do.	...	20	Walcheren Broccoli	...	19
Red Cabbage	...	9	Barri's selected Beet	...	41
Aberdeen Turnip	...	35	C. G. White's Chery	...	31
Knol-khol	...	23	C. G. Summer Co's Lettuce	...	25
Orange Carrot	...	16	C. G. do. Cabbage do	...	29
Beet	...	13	Bedfordshire Onion	...	0
Broccoli	...	3	Moore's Vegetable Cream	10	8
White Celery	...	15	Variegated Broccoli	50	35
Horn Carrot	...	19	Sandingham Sprouts	...	22
Parsley	...	6	C. G. Champion Parsley	...	23
Red Celery	...	10	Dixon's Mammoth Celery	...	34
Sage	...	8	Long Surrey Carrot	...	30
Majoran	...	4	Snowball Turnip	...	18
Onion	...	0	Telegraph Cucumber	10	10
Cabbage Lettuce	...	10			
Tomato	...	2			
Cos Lettuce	...	4			
Basil	...	5			
Cucumber	10	8			
Squash	10	3			
Melon	10	3			
Total Seeds sown	...	930	Total Seeds sown	...	870
Total Plants raised	...	339	Total Plants raised	...	478





# Monthly Proceedings of the Society.

*Thursday, the 18th January, 1872.*

**J. A. CRAWFORD, Esq.,** *President in the Chair.*

THE Proceedings of the last monthly meeting having been read and confirmed, the Chairman read the Annual Report from the Council:—

Proposed by Mr. M. Henderson, seconded by Baboo P. C. Mittra and resolved that the Report be adopted.

The election of Officers and Council for the current year was next proceeded with. Messrs. Lyman and Sturmer, as Scrutineers, reported the result to be as follows:

*President.*—Mr. J. A. Crawford, C. S.

*Vice Presidents.*—Rajah Suttanund Ghosal, Bahadour Messrs. A. H. Mowbray, S. H. Robinson, and M. Henderson.

*Secretary*—Mr. A. H. Blechynden.

*Council.*—Mr. L. Berkeley, Baboo Romanauth Tagore, Mr. R. Blechynden, Mr. B. D. Colvin, Baboo Pratapa Chundra Ghosa, Baboo Peary Chand Mittra, Mr. W. H. Cogswell, Dr. C. Fabre-Tonniere, Mr. W. Stalkartt, Colonel E. J. C. Wintle, Mr. John Scott, and Mr. T. H. Mosley

*Standing Committees.*—The name of Mr. J. P. Thomas was added to the Silk Committee in place of Mr. G. Conti leaving India. The other Committees needed no additions.

The ordinary business was then proceeded with, and the following gentlemen, proposed at the last meeting, were elected Members:

The Maharajah of Cashmere, Messrs. Lionel Ingels and A. Hotson, Colonel J. T. Shakespear, Captain A. C. Dando, and Lieutenant T. Davison.

The names of the following gentlemen were submitted as candidates for election:—

M. P. Dunne, Esq., Zemindar, Sums Jald, Azimgurh,—proposed by Mr. T. M. Russell, seconded by the President.

Aeneas Macdonald, Esq., Lohurreah Factory, Chumparun,—proposed by Mr. T. M. Gibbon, seconded by Dr. Tonnerre.

Succarum Martund, Esq., Indore,—proposed by Dr. T. Beaumont, seconded by the Secretary.

R. DeDombal, Esq., Neechindpore, Kishnagur,—proposed by the Secretary, seconded by Baboo P. C. Mittra.

Dr. Sydney Lynch, Superintendent, Alipore Jail—proposed by Dr. A. J. Payne, seconded by Mr. F. L. Beaufort.

Dr. Geo. King, Superintendent, Royal Botanic Garden, proposed by the President, seconded by Dr. Tonnerre.

The following contributions were announced :—

- 1.—Report on some of the Forests in England and Scotland, by T. W. Webber, Forest Department, India; Report on the collection of Seeds and Plants of the Cinchonas of Petayo, by Robert Cross; and Notes on the Quinquinas by H. A. Weddell; from the Department of Agriculture, Revenue, and Commerce.
- 2.—On the Genesis of Species, by St. George Mivart; from J. A. Crawford, Esq.
- 3.—A Report on the Expedition to Western Yunnan *via* Bhamô, by Dr. John Anderson; from the Author.
- 4.—Records of the Geological Survey of India, Vol. IV., Pt. 4, from the Government of Bengal.
- 5.—Report of the Committee of the Bengal Chamber of Commerce, from 1st May to 31st October, 1871, from the Chamber.
- 6.—Catalogue of Plants of the Botanic Garden at Pondicherry; from the French Consul.
- 7.—Report of the Committee of the British Indian Association for quarter ending 30th April 1871; from the Association.
- 8.—A large quantity of seed of the China tallow tree (*Stillingia sebifera*; from W. Minjo, Esq.
- 9.—Capsicums of a large size, raised from seed received from the Society; from R. S. Pyne, Esq.
- 10.—Seed of *Gloriosa superba*; from Colonel D. Ryder. Mr. Scott remarked that he had occasionally seen a few seeds of *Gloriosa* plants; if sown in the hot season and freely watered, they will germinate in from three to four weeks.
- 11.—A small ball of Caoutchouc and specimen of Cotton from the Looshai country, from General G. Bourchier.

Letters were submitted.

From Lieutenant J. F. Pogson, enclosing remarks on Saline efflorescence and a paper on Potato culture. (Referred to the Committee of Papers.)

From the Secretary, Department of Agriculture, applying on behalf of the Netherlands Government, for certain information connected with Rice cultivation in India. (Complied with.)

From General D. M. Stewart, Officiating Superintendent of Port Blair, applying for a variety of Tobacco seeds of a good quality, and specimen leaves of certain kinds of Tobacco. The Secretary announced that seeds had been sent to General Stewart. Dr. Tonnerre promised to give specimen leaves.

From the Secretary, Agricultural and Horticultural Society, Bombay, advising despatch of certain mango grafts for the new garden. These have

reached in very indifferent condition, and Mr. Scott reports that they have been very rudely prepared.

From the Agents, I. G. S. N. Company, and New River Steam Company, agreeing to convey plants intended for the new garden, free of freight; and from the Agents, D. I. S. N. Company, agreeing to convey the same at half rate.

The best thanks of the Society were tendered to these Companies for their liberality.

Mr. Lyman exhibited a fine healthy plant of *Croton maximum*.

Before the Meeting separated the Secretary drew attention to an enquiry from the Commissioner of Agriculture at Washington, as to whether the sugarcane ever matured its seed in the East Indies. This question, the Secretary mentioned, had more than once been before the Society. So long ago as in 1844 the Royal Agricultural Society of Jamaica made a similar enquiry and some interesting correspondence was the result. (See Journal, vol. III., p. 84 Appendix) shewing that so far as had been then ascertained, the cane was not known to be any where propagated by seed. In 1863, the subject was again mooted on the occasion of a small quantity of seed being presented by Mr. W. Haworth, which he had obtained from some fields of cane in the neighbourhood of Kandy in Ceylon. This seed was carefully sown in the Society's garden, but failed to germinate. The ratoon crops of foreign varieties of cane, more especially the China, had frequently been found to arrow in the Society's garden, but the seed had never proved fertile. The result of all enquiries would seem to show that sugarcane cannot be increased by seed.

Thursday, the 22nd February, 1872.

RAJAH SUTTYANEND GHOSAL, BAHADOOR, Senior Vice President, in the Chair.

READ a note from the President stating that indisposition prevented his attending the meeting.

The Proceedings of the Annual General Meeting having been read and confirmed, the Secretary submitted the following tribute of respect, to the memory of the Society's late Patron, which was agreed to at a recent meeting of the Council:—

"That this Society has heard with feelings of the greatest regret of the death of His Excellency the late Viceroy by the hand of an assassin at Port Blair on the 8th instant. Whilst deploring the calamity which has fallen on this country by the sudden removal of an able and enlightened Ruler, this Society desires to place on record its deep sense of the great loss sustained by itself, as well as by all fellow laborers in the same path, as also to the cause of Agriculture at large in India by an event which has robbed all of a warm friend and most generous supporter."

That a copy of the foregoing resolution be forwarded to Major O. T. Burne, Private Secretary to His Excellency the late Viceroy, for communication to Her Excellency the Countess of Mayo.

Proposed by Baboo P. C. Mittra, seconded by Rajah S. A. Ghosal and unanimously adopted.

Proposed by Dr. Tonnerre, seconded by Baboo P. C. Ghosa and resolved that this meeting do now adjourn to Thursday next, the 29th instant.

*The adjourned General Meeting was held on Thursday, the 29th February, 1872.*

J. A. CRAWFORD, Esq., *President, in the Chair.*

The following gentlemen were elected Members :—

Messrs. M. P. Duane, Aeneas Macdonald, Succarum Murtund, R. DeDom-bal, Dr. Sydney Lynch, and Dr. George King.

The names of the following were submitted as candidates for election :—

The Manager of the Halmurah Tea Estate, Assam,—proposed by the Secretary, seconded by the President.

Dr. W. Moir, Civil Surgeon, Meerut,—proposed by Mr. R. H. Smith, seconded by the Secretary.

Captain H. W. J. Senior, Superintendent of Jail, Meerut,—proposed by Mr. R. H. Smith, seconded by Mr. L. Berkeley.

Mrs. Bowers, Bluttuneeah factory, Baugulpore,—proposed by Mr. J. Gouldhawke, seconded by the Secretary.

Dr. K. B. Stuart, Calcutta,—proposed by Mr. C. E. Price, seconded by Mr. C. J. Sutherland.

Dr. David Douglas Cunningham, B. M. S.,—proposed by Dr. C. Mac-kenzie, seconded by the Secretary.

Colonel W. McCulloch, Cherra Poonjee,—proposed by Colonel H. Raban, seconded by the Secretary.

The following contributions were announced :—

1. Observations on the Geology and Zoology of Abyssinia, by W. T. Blandford. From the Government of India.

2. Flora Sylvatica of Southern India, Parts 13, 14, and 15, and Icones Plantarum Indiae Orientalis. Part 8. From the Government of India.

3. Memoirs of the Geological Survey of India—Palaeontologia Indica, Series 6 and 7. From the Superintendent.

4. Journal of the Asiatic Society of Bengal, Part 2, No. 4, 1871. From the Society.

5. Annual Report on the Administration of the Territories under the Lieut.-Governor of Bengal for 1870-71. From the Government of Bengal.

6. A few seedlings and some seed of Laburnum, the former raised at Mirzapore. From Mr. R. Nicolson.

7. Specimens of raw cotton, beans, tobacco seed, &c., from the Lboshai country. Presented by General G. Bouchier.

8. A collection of specimens of raw produce, fibres, arrowroot powder, sugar-cane, yams, &c., to which were awarded prizes at the first Annual Show of the Satkaira Agricultural Society. From the Secretary of the Society.

9. Four plants of *Couroupita Guianensis*; and a bundle of stalks with seed of the "Broom Corn" of California, raised in his garden. From Mr. R. M. Daly.

10. Specimens of Mangul-Wuerzel grown on the reclaimed portion of the Salt Water Lake. From Mr. W. Clark, Engineer to the Justices. These have been raised from Australian Seed furnished by the Society on sweepings watered by sewage.

#### PRIZES FOR TEA ESSAYS.

Read the following report from the Committee of Papers, (Messrs. Crawford, Robinson, and Berkeley).—

"Your Committee having read the Reports of the Judges appointed to examine the Tea Essays (eleven in number) submitted to compete for the prize offered by the Society, are of opinion that none of the Essays entirely fulfil the conditions under which they compete; but under the last clause of the Society's advertisement, and having reference to the general excellence of two of the Essays, they recommend that a prize of Rs. 300 and the Grant gold medal be awarded to Colonel Edward Money, late of Chittagong, and a prize of Rs. 200 and the Grant gold medal to Mr. J. F. W. Watson, Manager of the Amfield Tea Estate in Dehra Doon."

*Resolved*, that the Report be confirmed, and that the best acknowledgements of the Society be offered to the Judges for the trouble they have taken, and that they be requested to accept, in due course, a handsomely bound copy of the Prize Essays.

#### MISCELLANEOUS COMMUNICATIONS.

Letters were read —

From the Secretaries of the E. I. and E. B. Railways conceding to the Society's request for free transit of plants for the new garden.

The best acknowledgements of the meeting were tendered for this liberal concession.

From the Secretaries of the Public Gardens at Benares and Lucknow, and from the Model Farm Garden at Cawnpore, forwarding rose plants and fruit grafts for the new garden.

From Lieutenant J. F. Pogson mentioning that the "cheel" (*Pinus sylvestris*) of the Himalayas, grows most luxuriantly at Umballa.

"There are two of these firs, in a garden in the staff lines, their diameter is fully twelve inches each, and their height may be between 30 and 40 feet. These trees cannot be more than 26 years old, and their vigorous growth shows that the formation of Fir Plantations in the plains of the Punjab is quite feasible.

"The proper time for transplanting is the first half of December. The seedlings may be obtained in any number from the Simla and Kussowlie Hills, and if carefully taken up, seldom fail."

In a subsequent letter Mr. Pogson offers a few remarks regarding a free-bearing hill date and a fine large fig :-

"Did I ever tell you that there is a *bond fule* hill date, which bears abundantly, and ripens fruit, said to be very sweet. The trees are met with on the Simla road, nearly half way between Kalka and Dhurumapore, which is the name of the first stage and bungalow. The date both in and out of the Pinjore Valley, does not ripen its fruit, whereas the date alluded to grows fully 3,000 feet above the sea level, and does so. There is also a very fine large fig in the same locality. The fruit when ripe is good, but deficient in sweetness. The tree and fruit bear the Palaree name "Tee-mul," and the leaves are of the full 'Apron' size."

From Colonel J. B. Thelwall respecting a peculiar kind of wheat raised by him in the Dehra Doon from seed received from the Punjab. "I have about 20 acres," writes Colonel Thelwall, "sown with some wheat I originally picked up in the Punjab. It has a long black beard, and pigs and birds *won't* touch it; the grain is enormous in size it is a very heavy bearing wheat, and produces first-rate flour. I have never seen any wheat to equal it in any country. If you would like a maund or so let me know, and I will send it when we get the crop in."

The Secretary stated he had accepted Colonel Thelwall's kind offer.

From E. W. Molony, Esq., Commissioner, Rajshahye Division, forwarding two specimens of paddy of an unusual kind received from the Magistrate of Rungpore, and requesting a report on them. The Secretary mentioned he had requested Mr. Molony to send a larger quantity to admit of a report being made on the quality of the rice.

From the Secretary, Government of Bengal, further correspondence connected with the despatch from England of hermetically sealed cases of plants, &c., contained in the following letters :-

( *From Director General, Post Office of India, to the Government of India, Department of Agriculture.*

' Sir,—In continuation of this Office letter, No. 2078, dated 14th August 1871, I have the honor to forward copy of letter, No. 1,18,887C, dated 6th December 1871, from the Secretary to the General Post Office in London.

2. The special concessions in respect to the transmission of plants, bulbs, seeds, &c., by pattern post, referred to by the Secretary of State in his letter

to the Government of India in the Financial Department, No. 19, dated 22nd April 1871, were apparently made in 1868, and have since, I gather, been withdrawn by the London Post Office. I therefore regret to state that I do not see how hermetically sealed tin cases containing timber trees and flowering shrubs can be sent through the post between England and India by pattern post.

*From the Secretary, General Post Office, London, to the Director General Post Office, India.*

Sir,—Referring to your letter of the 14th August last, stating that, in a despatch from Her Majesty's Secretary of State for India, No. 19, dated 9th March 1871, the Government of India had been informed that the Post Master General had consented to an arrangement under which plants, bulbs, seeds, &c., could be transmitted between England and India by pattern post in air-tight cases, exceeding by three pounds, the maximum weight (five pounds) usually allowed, I beg leave to acquaint you that some correspondence on this subject did certainly pass between the India Office and this Department early in the year 1868, and such a concession as that to which you refer was granted, under certain conditions, by this Department, in favor of the India Museum, on behalf of which Department the request for this concession was made by the India Office.

As no application had been received from your Office in the matter, the decision was of course not communicated to you by this Office; but the answer was sent to the India Office, whence the application emanated. Why the Government of India was left in ignorance of the concession which had been made by this Department until March of the present year, I am unable to explain.

Since the time, however, when the concession was made, the views of the Department with regard to the pattern post have undergone some modification, as you are already aware.

From Lieutenant Pogson, forwarding leaves and bark of the "muko" and "mukoe," in continuation of former correspondence. Mr Scott pronounces the first to belong to *Solanum nigrum* and the second, "so called" Sarsaparilla mukoe of Shakespeare's Dictionary are evidently of some species of *Capparis* which might probably be of easy determination were fair specimens sent; anyhow, if the plant yields Sarsaparilla, it is the only special quality that it has in common with any member of the genus *Smilax*. I may add that several members of the caper order have pungent, stimulant, anti-scorbutic, and other medical qualities.

Mr. Price submitted fine healthy plants of *Strobilanthes maculatus*, *Sanchezia spectabilis* and a *Fuchsia* in bud; also some well flowered specimens of *Antirrhinum* of various colors. Mr. Rogers exhibited a *Hyacinth* in



good flower, the finest yet shown. Mr. Lynam forwarded a fine plant of *Fittonia gigantea*, and *Oncidium ampliatum*. (Marks to be determined at the next meeting.) To Mr. Lynam was awarded 10 marks for his *Croton maximum* shewn at the last meeting, imported from England; 10 marks for his *Dieffenbachia Wierii*, and 6 for his new *Caladium* (Meyerbeer) exhibited at the December meeting.

The Secretary placed on the table a plantain trunk with a bunch of fruit growing out of the centre, which he had cut from a small plantain top in his garden. Mr. Scott remarked that he had never observed this before in the plantain, but occasionally with palms, &c, which had been injured towards the summit. In the case of the plantain, it was doubtless a similar result; the growing point having been checked in its normal development, has burst through and extended laterally. It is not thus a perpetual abnormality.

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*Thursday, the 21st March, 1872.*

J. A. CRAWFORD, Esq., *President, in the Chair.*

The Proceedings of the Meeting of the 22nd February and of the adjourned Meeting of the 29th February were read and confirmed.

The following gentlemen were elected Members :—

The Manager of the Halmarah Tea Estate, Assam, Dr. W. Moir, Capt. H. W. J. Senior, Mrs. Bowers, Dr. K. B. Stuart, Dr. David Douglas Cunningham, and Col. W. McCulloch.

The names of the following gentlemen were submitted as candidates for election :—

Baboo Nreesingopersaud Doss, Nubberdeege, Nudden,—proposed by Mr. A. Rogers, seconded by the Secretary.

G. R. C. Williams, Esq., C. S., Dehra Doon,—proposed by the Secretary, seconded by the President.

G. G. Morris, Esq., C. S., Backergunge,—proposed by the President, seconded by Mr. A. T. Muclean.

James Sheetz, Esq., Civil Surgeon, Futtehpore,—proposed by the Secretary, seconded by the President.

Charles Halford, Esq., Bill Broker, Calcutta,—proposed by Mr. M. Henderson, seconded by Mr. W. Stalkart.

The following contributions were announced :—

1. Records of the Geological Survey of India, Vol. V, Part 1. From the Superintendent.

2. The *Flora Sylvatica* of Southern India, Part 16. From the Government of India.

3. A Treatise on silk manufacture. From C. E. Blechynden, Esq.

4. A quantity of Teak Seed. From J. A. Crawford, Esq.

- 5 A collection of Orchids from Shillong. From Major T. Pollok.
- 6 A collection of Rose plants from the Public Garden at Lucknow. From Dr. Bohavia.

Read the following letter from Major Burne, in acknowledgement of the Resolution passed at the last Meeting —

MY DEAR CRAWFORD,

I have laid the enclosure of your letter of to-day before the Countess of Mayo, and she desires me to ask you to convey to the Council of the Agricultural Society her best and heartfelt thanks for the kind and sympathizing terms in which the Resolution has been recorded by the Society.

GOVT HOUSE, CALCUTTA, }  
November 1th, 1872 }

Yours sincerely,  
O. T. BURNE.

#### ENQUIRY IN RESPECT TO THE USE OF SALT IN AGRICULTURE

Submitted the following correspondence with the Government of India, Department of Agriculture, on the above subject. —

*To the Secretary to the Agri-Horticultural Society of India, dated Fort  
Walton, the 28th December, 1871*

I am directed to forward herewith a copy of the Prize Essays published by the Salt Chamber of Commerce of Northwich, upon the use of Salt in Agriculture, and to request that you will move the Agri-Horticultural Society to favor the Government of India with their opinion as to whether any portion of these essays is so far applicable to India that it would be useful to circulate the information in a popular form.

*To the Secretary, Government of India, Department of Agriculture, dated  
Metcalfe Hall, 11th March 1872.*

I have the honor to acknowledge receipt of your letter together with Prize Essays on the use of Salt in Agriculture, published by the Chamber of Commerce of Northwich.

2. The Council of the Agricultural Society are of opinion, after mature consideration, that no great or useful results would be attained by the farmers in India by the circulation or publication of any portion of the said Prize Essays.

3. Salt as a manure is known to have its advantages and disadvantages according to the character of the soil to be treated, but it could nowhere be safely used except under the guidance of a chemical analysis of the soil to be treated, as where its use is not indicated, its application is injurious. As it is not therefore a general and sure specific, as a rule it is never likely to be resorted to in place of any of the other manures in common use.

4. It is besides doubtful if such a special specific as Salt manure is much needed for the Bengal soil, owing to their generally saline character,

and as even where required, its judicious application would probably be a serious difficulty, for the reasons above given; it is on these grounds the Council base their recommendation not to move, in the matter.

#### PROPOSAL TO SUPPLY EGGS OF SILK-WORMS.

Read the following memorandum from Dr. G. King, Superintendent of the Botanic Garden:—

Captain J. Murray (Invalid Establishment) of Dehra Dhoon and Mussoorie, N. W. P., having for many years devoted his attention to experimental Sericulture, now proposes to supply eggs of fine quality. The peculiar advantage held out by Captain Murray is that the eggs are yearly taken up to Mussoorie (elevation 6,200 feet above the sea) during the hot weather and rains and brought down to Dehra Dhoon (on the plains) towards the end of October, the cocoon being spun shortly afterwards. By this means the quality of the worm (the Cashmere variety) is kept up.

Some cocoons are sent herewith, as Captain Murray says, "not as fine specimens, but because it is generally supposed that silkworms will not stand a sudden change of temperature. I did not lose a single worm (continues Captain Murray) by bringing them down from Mussoorie to Dehra on 28th October last, nor is this the first time I have tried this experiment." Captain Murray would propose to send out the eggs in December annually, and, if enough inducement were offered at the rate of about a rupee an ounce delivered at Dehra.

The opportunity offered by Captain Murray seems an excellent one for growers in the plains, periodically, to supply themselves with good healthy undegenerate seed, and is recommended to the notice of the Council of the Agri-Horticultural Society.

Captain Murray will be happy to afford further information to applicants.

The Secretary mentioned that he had, as directed by the Council, forwarded copies of the above to certain houses interested in Sericulture. Mr. Burgett (of Lyall, Rennie & Co.) had informed him that they had tried these eggs at their filatures, but all attempts to raise worms from them had proved a complete failure.

#### A SIMPLE AND INEXPENSIVE MODE OF DRYING POTATOS.

Read the following letter from Lieut. J. F. Pogson:—

In reference to previous correspondence on the subject, I have now the pleasure to inform you that I have discovered, a very simple and inexpensive way of drying potatoes.

My object in solving this problem, was to secure a large supply of food, at the time other crops were growing, and which should also be available in case of famine.

The potato, though rich in starch, is poor in gluten, and it was necessary, if possible, to remedy this defect. It is proper that I should here mention that I

fully succeeded in drying twelve ordinary potatoes, by the hot sand process, but I condemned it, as being much too slow, and requiring apparatus which the agriculturist could not afford; further no increase of nourishment was secured.

By the new process not only is the potato very quickly dried, but its nutritive power is much increased by the presence of the drying medium or desiccator. The process is as follows, viz.:

1st.—Secure some *dall*-meal or flour, using the common *Oord dall* for the purpose.

2nd.—Dust a clean cloth with this meal.

3rd.—Take any number of dry potatoes, (which have been well washed before drying,) and cut off the rose end (which keep for seed,) and the root end, (which use or keep for cattle food.

4th.—Cut the body or best part of the potato so obtained, into slices, about  $\frac{1}{2}$  to  $\frac{3}{4}$  inch thick, and place these discs (without removing the skin or peel) on the floured cloth, until it is covered with them, when their upper surface is to be dusted over with *dall*-meal, and left alone, whilst a second, third, or fourth cloth is being similarly covered with sliced potato.

5th.—Remove the potatoes (in order of preparation,) and place them on mats to dry in the sun, turn them three or four times, and so expose them for three days, when store in baskets, and let dry in the shade.

6th.—When a slice can be broken like a biscuit, the process is complete, and the dried potato is ready for use, or storing. The fracture reveals the dried starch confined within the film or layer of *dall* meal. It stands to reason that the gluten of the *dall* has enriched the starch of the potato, and as not a particle of the original potato gluten has been removed, the dry potato so obtained, is a superior article as compared with any other description of the dried tuber.

According to Professor Johnston's table, one hundred pounds of dried potatoes contain of

Water	...	...	...	...	Nil.
Skin	...	...	..	.	11.
Starch	...	..	..		76
Gluten	...	.	...	.	8
Fat	...	..	...	.	1.
Mineral matter	...	...			4.

I believe the potatoes were put in a press, and the water thus removed. By my process the best part of each potato is preserved for human food, whilst the inferior parts may be similarly treated and kept for cattle food.

I trust the publication of this communication will induce others to carry on the preparation on a large scale, and I think when the ryot learns the value of the potato, he will not object to cultivate it as a field crop.

I have reason to believe that sliced turnips may be dried on this plan, with perfect success, and as the superior descriptions of *dall* may be used, a very

delicate article of food would be the result, and especially so, if the potato skin was removed when the slices had somewhat hardened.

Mr A. B. F. Thompson submitted for exhibition a full-sized working machine made under his superintendence, for the preparation of fibres. Mr. Thompson is willing to dispose of this machine

To Mr. Lynam for his *Fittoua grandia*, a very ornamental plant, submitted at last Meeting, and quite a new introduction, ten marks were awarded, and six marks for his *Oncidium acrocladum* which though for years in the collection of the Botanic Garden, is still a rare plant

To Mr Archibald Rogers ten marks were given for his fine Hyacinth in full bloom.

Thursday, the 18th April 1872.

J. A. CRAWFORD Esq., *President, in the Chair*

The Proceedings of the last general Meeting were read and confirmed.

The following gentlemen were elected Members

Baboo Nee-magopal and Posi, Messrs G R C. Williams, G G Morris, James Sheetz, and Charles Halford.

Mr. C. M. Jordon, Sub-Deputy Opium Agent, Cyn, was proposed a member, by Baboo Benala Churn Bhattacharya, seconded by the Secretary.

Messrs. H Richardson, C. S., Kishnagaur, and A. Boulderson, C. S., Bijnore, intimated their desire to join the Society.

The following contributions were announced --

1. The Flora Sylvestris of Southern India, Parts 15, 16, and 17, and Report on Indian Cattle Plagues, &c From the Government of India, Department of Agriculture.

2. Memoirs of the Geological Survey of India, Vol. 7, Part 3, and Records of ditto, Vol. 5, Part 1. From the Superintendent

3. Selections from the Records of the Government of India, Home Department, Nos. 52 to 83. From the Government of Bengal.

4. Bulletin Mensuel de la Société des Agriculteurs des France, March 1872. From the Society

5. Journal of the Asiatic Society of Bengal, Part 1, No. 3, 1871. From the Society.

6. A brief history of Bengal Commerce Part 2, by Kissen Mohun Mullick. From the Author

7. A small assortment of seeds of Australian trees, ornamental plants, &c. From the Baron Von Mueller.

8. Seeds of *Clanthus Dampieri* from New Zealand. From John Thomson, Esq.

9. A collection of plants, about one thousand From the Superintendent of the Eden Gardens.

10. A plant of *Salvadora Persica*. From R. M. Daly, Esq.

A report was submitted from the Special Grain Committee, (Messrs. S. H. Robinson, W. H. Cogswell and Baloo Peary (Grand Mittra) on the relative working and cost of the Rice Husking and Winnowing Machine, submitted for inspection by Messrs. T. E. Thomson in June last, and of a Bengalee Dakoe. The result shows that the cost of cleaning by the former is one anna four pies per mound against fifteen annas by the latter.

The Secretary read the following memorandum regarding a trial made of preserving seed in ice.—

In February 1869, Dr. James Irving, Civil Surgeon, Allahabad, suggested that a trial should be made for preserving the germinating power of imported seed by placing them in ice. This suggestion was overlooked that year, but in the following year, October 1870, a tin parcel of American vegetable seeds, carefully sealed, was placed in the pit of the Ice House. A parcel of Australian vegetable seeds, similarly packed, was retained in the Society's seed room. In October 1871 both packets were transferred to Mr. Scott, Curator of the Royal Botanic Garden, who reported that the American seeds had entirely lost their vitality, whilst the Australian seeds looked good. A trial sowing was made of the latter, under Mr. Scott's superintendence, and the result was altogether satisfactory, as shown by the annexed report. Of the 21 seeds sown, 3 entirely failed, but the others gave a percentage of from 10 to 50, on a general average of 24 per cent.

The Grant gold medals awarded to Mr. J. F. W. Watson and Colonel Edward Mowbray for the best Essay on the cultivation and manufacture of Tea were placed on the table and much admired. It was resolved that the best acknowledgements of the Society be tendered to Colonel Hyde, Master of the Mint, for his kindness in having these handsome medals prepared at the Mint.

#### BLIGHT IN MANGO TREES

Colonel C. Reay, writing from Benares, 27th March, refers to a blight then attacking the mango blossom, and enquires if any remedy be known for it.

"Can you tell me," writes Colonel Reay, "whether there is any remedy known for a kind of blight known by the natives under the name of "liye" (pronounced "lie") which has this year attacked and destroyed many of the best Bombay mangoes when in blossom. The flower has withered away leaving no fruit, and the leaves are covered with a slimy substance, just as if they had been varnished, which dries and is sticky like bad varnish. There are thousands of small flies and the natives seem to have no remedy against the disease.

"The season promised to be very good for mangoes but many trees will now be fruitless. The hot winds have set in unusually early and do much damage to gardens, though good weather for the harvest."

The Secretary read the following remarks with which he had been favored by Mr John Scott on the above subject :—

"The blight on the mangoe trees referred to by Colonel Reay seems to be what is called 'honey-dew.' In the gardens here I have occasionally observed it on mangoes, peaches, and various other trees. It is very injurious to vegetation, as under it the leaves, &c., become covered with a viscid substance (whence doubtless the native name *liyee* or *lie*, a corruption of *lisa*, gum) which suppresses respiration. Hot and dry weather favor its development. It seems to have its origin in the attack of aphides or green-flies, and the character it assumes is apparently due to exudation from their punctures in the leaves, combined with their natural excretions. The most effective and indeed the only really practicable remedy for the disease in arborescent plants, is copious syringing either with plain water, or that mixed with soft soap. It must of course be applied with a good garden engine.

"In cases where this disease has got fairly a-head, and not attended to until the trees are in blossom, it is of course impossible to save the crop : syringing then to cleanse the affected parts will also destroy the blossom ; it should thus be practised prior to the expansion of the flower."

#### FLOWERING OF THE BAMBOO AT JUBBULPORE.

In an interesting communication from Colonel C. S. Ryder, on other subjects, he alludes to the recent blossoming of the bamboo at his station in the following words :

"Now have you ever heard of this. If when those beautiful clumps of bamboo flower and seed, they die and we have lost one of the great beauties of the station. I was told two or three months ago, that if you cut the bamboos down to somewhere near the ground when they are flowering, they grow up again and do not die. I wish I had known it a year earlier, I might have saved our grand clumps, some of them 50 and 60 feet high.

"Perhaps it might be cut down only a foot or two below the flowering part, and it would do as well or better. I think it would be well if this was more known than it is.

"The bamboos that are cut are all in prime order for any use. If not cut down in time they seed and the bamboos die, roots and all. Well, I had two small but very pretty clumps in the public gardens which had escaped last year, when almost all the bamboos died. They began to flower and I thought of their cure, cut them down leaving a foot or 2 feet above the ground. They have both thrown out long thin shoots from what was left, and I consider they have been saved from a certain death, and will grow now for the next 30 or 40 years."

*Remarks by Mr. Scott.*—"With reference to Colonel Ryder's remarks on renewing the life-term of bamboos by cutting them down while flowering, I should think it can be but temporarily. Since I received Colonel Ryder's letter

from you, I have been looking to the several specimens of *B. spinosa*, which are flowering in the Botanic Garden here, and I observe that many of those which have had a few of their culms lately cut down in place of giving rise to leaf-shoots only are all flower-bearing even as the last and preceding year shoots. Now, though these clumps were only in part cut, I see no reason why they should all give rise to flower-shoots, if in the case of cutting down a whole flowering clump, leaf-bearing shoots only spring up. I have however made the experiment and shall in due course report the results with other observations which I am making on the flowering of bamboos.

"In the meantime I may state as partly confirmative of Colonel Ryder's authorities, that as it happened two clumps of *Bambusa spinosa* were completely cut down about a year ago, and that these are now the only non-flowering specimens of that species in the garden here. How long they may continue non-flowering, remains to be seen. As showing that those would have flowered if left uncut, I may state that many of the cut culms were buried lengthwise along one of the garden boundaries with the view of raising a fence from them—a not uncommon mode of multiplying bamboos. They succeeded well, and in the second year gave rise to vigorous shoots, which like the uncut clumps of the original progeny have all burst into flower. This remarkable fact shows how strongly the individuality is retained! so it is also by root division."

In a subsequent communication Colonel Ryder announces that the stumps from which he had cut the bamboos had thrown out branches, or rather shoots, which flowered uncut, so that will be of no use.

Mr. Scott observed that he suspected what the result would be with the cutting down of these flowering bamboos; the flowering effect is a concentrated and exhausting one, and he should have anticipated that it was then too late for any chance of renewal from cutting the flowering shoots down; the casual observation, however, in a previous letter shows that if cut down prior to the commencement of flowering, the life of the plant may be temporarily prolonged.

In connection with the foregoing, the Secretary drew the attention of the Meeting to some interesting particulars relative to the age and flowering of the bamboos in Rohilkund and Central Asia which were brought to the notice of the Society so long ago as February 1842. He read extracts therefrom to show that every portion of the plant died out after such flowering, though he had heard it contended that such was not the case, but that the old roots still retained their vitality from whence new shoots sprung out.

#### TERRESTRIAL ORCHIDS FROM THE NEILGHERRIES.

The Secretary next submitted extracts of an interesting communication of 10th February, from Mr. Grote, relative to certain subjects which had recently come before the Society, and alluded especially to one portion relative to Mr.



Wynton's letter regarding the tubers of a terrestrial orchid from the Neilgherries, known as "little man's bread," which was read at the Meeting in December last. Mr. Grote observes, "the December Proceedings reached me last week. You will find a figure of the terrestrial orchid in Wight's *Icones* which furnishes the salep tubers, or 'little man's bread'; at least I think so, the flower is pink with a double spur, it goes off in October and November."

In a subsequent part of the same letter, dated a day later, Mr. Grote adds—"I have just got the *Gardener's Chronicle* of yesterday, which I know you take in. See Major Benson's letter from Madras, at page 182; he there gives an account of the orchid which he met with in the Neilgherries, and refers the salep misso tubers noticed in your December Proceedings to the *Platanthera rautia*."

The Secretary mentioned that Wight's *Icones* in the Society's library being incomplete, he had referred the foregoing extracts to Mr. Scott, who offers the following remarks thereon:—

"With reference to Mr. Grote's remarks on the 'little man's bread' I have looked into Wight's *Icones* but I really cannot make out the plant he refers to as yielding the salep. I know of no orchid normally producing a *double* spur as Mr. Grote says the species referred to has. The most likely of those figured in the *Icones* is *Epilophium macrorrhynchos*, which has a roundish inflated and somewhat bilobed spur. The pseudobulbs of this species however are considerably elongated, not oblong or globose as described, and are which form the 'little man's bread.' I note Colonel Benson's remark on the *Platanthera mantha*, the tubers of which are the salep produce of the natives, but probably distinct from the 'little man's bread' of Mr. Wynton.

#### PROBUCULIFEROUS NOTES.

In his communication already referred to, Colonel Ryder alludes to the seedling at Julialapone and in a vicinity, of certain climbing plants which are generally propagated by cuttings:—

"Another thing I have found is that the *Petroea* seeds here, not a flower falls but it bears its little one seed. I have had quantities of the flowers gathered and I send you a specimen of the seed. Colonel Poulton who has been at Sagur for some years, found that the *Bauhinia* seeded, and if the ground round it was carefully swept when the flowers had fallen, a certain amount of seed (like a small grain of wheat or rather oat, a great deal smaller than a grain of either of course). I am keeping a careful look-out for the seeds of all these things, creepers and English flowers, for this place seems peculiar in that way. I fancy there are a number of plants and creepers that get acclimatized, the climate and soil seem to agree with such a number. The *Tecoma Jasminoides* seeds plentifully, and I believe the *Bignonia venusta* does so also, for I notice that the flowers have their seed vessels

large and quite noticeable while the flower is blooming. I shall be glad to send you seeds of all these creepers as I get them."

The Secretary remarked that none of these climbers that he was aware of yield seed in Calcutta, and he had therefore requested Colonel Ryder to send as much as he could gather of each sort. Mr. Scott observed that with the exception of *Petrea* none of the others produce seeds in the Royal Botanic Gardens.

Dr. G. King and Mr. S. Jennings were appointed to fill vacancies in the Council caused by the departure from India of Colonel Wuttle and Mr W. H. Cogswell.

The Rajah Suttanund Ghosal, Bahadoor, submitted a healthy plant, in flower, of *Anthurum Scherzerianum*, for which ten marks were awarded.

Thursday, the 23rd May, 1872.

J. A. CRAWFORD, Esq., President in the Chair

The Proceedings of the last Meeting were read and confirmed.

Mr C. M. Jerdon was elected a Member, and Mr T Hope Laurie intimated his desire to re-join the Society.

The names of the following gentlemen were submitted as candidates for election:

Charles Chayne, Esq., Supdg. Engineer, Mhow,—proposed by Dr. Thos. Beaumont, seconded by the President

D. M. Gardner, Esq., C. S., Jampur,—proposed by the President, seconded by Rajah Suttanund Ghosal, Bahadoor.

Hugh W. Tulloch, Esq., Merchant, Calcutta,—proposed by Mr. S. H. Robinson, seconded by the President

Secretary, Public Garden, Bannu,—proposed by the President, seconded by Mr. S. H. Robinson.

R. McIntosh, Esq., Merchant, Calcutta,—proposed by the President, seconded by W. Pirie Duff, Esq.

His Highness Anund Rao Puer, Rajah of Dhu Sirdarpore,—proposed by Major W. Kincaid, seconded by the President

J. Kenneth Moran, Esq., Merchant, Chandernagore,—proposed by Mr. Robt. Mitchell, seconded by Mr. S. H. Robinson.

The following contributions were announced:

Report on Meteorology, Museum and Horticultural Garden in the Province of Oude, for 1870-71, from the Government of Bengal.

Annual Report of the Agricultural and Horticultural Society of Madras, for the year 1871, from the Honorary Secretary.

Journal of the Asiatic Society of Bengal, Part II., No. 1, 1872, from the Society.

Proceedings of the Asiatic Society of Bengal, Part IV., April 1872, from the Society.

Record of the Geological Survey of India, Vol. V., Part 2, 1872, from the Superintendent.

The Flora Sylvatica for Southern India, from the Government of India.

Transactions of the Scottish Arboricultural Society, Vol. VI., Part 1, and a pamphlet, Remarks on Tea, Manufacture in the North-West Provinces of India, by Mr. William Bell, extracted from the Transactions, Botanical Society, Edinburgh.

#### ACCLIMATED PEAS.

The Officiating Secretary submitted a letter from Mr. F. Halsey, of Unrisur, on the result of his cultivation of peas for the Society. Eighty lbs. of imported American Stock, gave a return of 720 lbs. of seed, at a cost of Rs. 87-12-6. Mr. Halsey writes, that one sort (20 lbs.) never even flowered, and that the crop suffered much from the baneful effects of east winds in the early spring, which will account for the short out-turn.

The best acknowledgments of the Society were accorded to Mr. Halsey for the trouble so kindly taken in raising the seed, which is now ready for free distribution on the application of members.

#### SUPPLY OF GARDEN SEEDS FOR 1872, AND PLANTS FOR THE SOCIETY'S NEW GARDEN.

Read letter from Messrs D. Landredth & Son, of Philadelphia, advising despatch, per *City of Poonah*, of three cases Indian corn, Balsam Zinnia, and tobacco seeds, and also vegetable and flower seeds for the use of the Society's garden. The balance of the order for vegetable and flower seeds was nearly ready and would be shipped in a few days by sailing vessel, *via* the cape of Good Hope, and may be expected here early in July.

The Officiating Secretary mentioned that the Indian corn seeds, Balsam Zinnia, and tobacco seeds were ready for delivery on the application of members.

Read letter from Messrs. Vilmorin, Andrieux, & Co., Paris, promising prompt attention to the Society's order for vegetable and flower seeds. These may be expected in all August.

Read letter from Messrs. Law, Sonner, & Co., of Melbourne, promising attention to order for field seeds, remarking on the fine condition of the in-coming crop. Promising an early shipment of Araucarias and roses for the Society's new garden.

Read letter from Mr. W. Bull, of London, advising a shipment of rare exotic ornamental plants for the Society's new garden.

The Officiating Secretary reported the safe receipt of the Wardian case

and that the same had been kindly taken charge of by Mr. Scott to be cared for until the New Garden is in a fit state to receive the plants.

#### WAX-PRODUCING INSECTS.

Read letter from Mr. F. Moore, Indian Museum, London, in allusion to the wax-producing insect found on a tree called "Kowa" or Arjoon (*Tala* Proceedings, December, 1869). Requests to be favored with sample of the above yielder in all its stages, for the purpose of examination and exhibition in their Museum Mr. Moore adds "I should at all times be very pleased to have the opportunity of examining and reporting on any noxious insects or insect-products that your Society might feel disposed to forward for that purpose."

Agreed that specimens of the wax-producing insects be forwarded to Mr. Moore as soon as obtainable, for which application has already been made to Mr. Peppe.

#### VARIOUS COMMUNICATIONS.

Read letter of inquiry from Mr S. E. Peal, of Sapakatie, Soebagur, Assam, on the subject of the introduction of some strong stemmed paddy in lieu of the Carolina paddy, which latter is not a taking variety with the natives of his district: it does not ripen at once, and will not yield more than one crop Mr. Peal then enters upon the subject of another inquiry as follows:

"Have you seen the series of silk-worms, pierced by a fly, that I sent to the Museum, also the fly in its several stages? I fancy silk farming of A. Ricinus could hardly be safe with such an enemy. I once put out 60 fine worms of 2nd moult, and before they were pukka, every single one was pierced, and many dead. Some had 21 punctures, each one enough to spoil a cocoon."

Read letter from Col. Edward Money expressing his thanks to the Society for the handsome Gold medal awarded for his Tea Essay. Col. Money writes: "I thank the Society much for the gift, which I shall prize highly."

#### PATRON OF THE SOCIETY.

It was resolved that His Excellency, the Viceroy be solicited to become the Patron of the Society in succession to the late Viceroy.

Mr. G. O. Bechy exhibited a monstrosity in the shape of a double Mango.

The Rajah Suttyanund Ghosal, Bahadoor, exhibited a healthy and well grown plant of the *Higginsia Ghisbriita*—a native of South America. Agreed that it be referred to Mr. Scott as to the number of marks to be awarded.

Mr. John Scott exhibited a fine specimen of the *Allamanda Violocca*, which has for the first time flowered in Bengal. Mr. Scott writes: "This, as will

be observed, is a most valuable addition to the several kinds we already have in our gardens, all of which are of a more or less brilliant yellow or orange colour : whereas this is a pale livid red, with a dull purplish colored throat. It contrasts very effectively with those, and like them promises to be a profuse bloomer. It is one of the many South American flowering shrubs which have been introduced to our gardens by Mr. G. Bartlett, who very kindly contributed his only specimen to the Botanical Garden."

*Thursday, the 27th June, 1872.*

J. A. CRAWFORD, Esq., *President in the Chair.*

The proceedings of the last General Meeting were read and confirmed.

The following gentlemen were elected Members

Messrs. Charles Cheyne, D. M. Gardner, Hugh N. Tulloch, R. McIntosh, J. Kenneth Moray, the Secretary, Public Garden, Bannu, and His Highness Anund Rao Puer, Rajah of Dhur

Captain R. G. Smyth, Hazareebaugh, intimated his desire to rejoin the Society. Agreed to.

The names of the following gentlemen were submitted as candidates for election :—

W. Kemble, Esq., C. S., Purneah,—proposed by Mr. J. D. Ward, seconded by the President.

Secretary, Local Committee, Hoshungabad,—proposed by Captain T. W. Hogg, seconded by the President

Major E. G. Clark, Settlement Officer, Kheri,—proposed by Major A. E. Wilkinson, seconded by the President.

C. E. R. Girdlestone, Esq., C. S., Nepal,—proposed by the President, seconded by Dr. D. Wright.

H. W. Craigie, Esq., Lulkipore Tea Estate, Cachar,—proposed by Mr. Alfred Spicer, seconded by Mr. W. Stalkart.

Henry Joseph Leitch, Esq., Broker, Calcutta,—proposed by Mr. E. Shearin, seconded by the President.

H. G. Sharp, Esq., C. S., Assistant Magistrate, Raneeunge,—proposed by Mr. Alexander Stuart, seconded by Mr. S. H. Robinson.

Richard Charles Walker, Esq., Bhowarah Factory, Purneah,—proposed by Mr. G. W. Shillingford, seconded by Mr. J. Gouldhawke.

Baboo Romunath Iyew, Solicitor, Calcutta,—proposed by Mr. A. Rogers, seconded by Baboo Feary Chand Mittra.

Captain Gerard Noel Money, Commanding 5th Punjab Infantry,—proposed by the President, seconded by Mr. S. H. Robinson.

Major General Fraser Tytler, C. B., Commanding Sirhind Division,—proposed by Mr. F. D. Daly, seconded by Mr. S. H. Robinson.

Captain Charles Young, Meywar Bheel Corps,—proposed by the President, seconded by Mr. W. Stalkart.

Baboo Godnender Nath Tagore,—proposed by Baboo Peary Chand Mittra, and seconded by Rajah Suttayanund Ghosal, Baludoor.

Dr. J. B. White, 42nd Assam Light Infantry,—proposed by Mr. J. M. Wood, seconded by Mr. S. H. Robinson.

Mr. R. W. Snow, Tea Planter, North Luekingpore, Assam,—proposed by Mr. J. J. Gray, seconded by Mr. S. H. Robinson.

Society, Public Garden, Mirzapore,—proposed by Mr. R. Blechynden, seconded by Mr. S. H. Robinson.

The following contributions were announced—

Proceedings of the Asiatic Society of Bengal, No. 5, for May 1872, from the Society.

Annual Report of the Board of Regents of the Smithsonian Institution for 1869. Report of the Commissioner of Patents for the year 1867, 4 vols., from the Smithsonian Institution.

Annual Report for 1869, and Monthly Reports for the year 1870, of the Department of Agriculture, and Reports on the Diseases of Cattle in the United States, from the Smithsonian Institution

Proceedings of the Boston Society of Natural History, in continuation from folio 225, to folio 368, from the Society

Transactions of the New York State Agricultural Society, Vol. XXVIII., for 1868, from the Society.

A lecture on Commercial Manures delivered at Augusta in January, 1869, by S. L. Goodale, Esq., from the Lecturer.

Historical Notes on the Earthquakes of new England, 1638 to 1869, from the Smithsonian Society.

The Flora Sylvatica for Southern India, Parts XVII., XVIII., XIX., XX., and XXI., and Icones Plantarum Indie Orientalis, Part IX., from the Government of India.

Annual Report of the Agri-Horticultural Society, Central Provinces, for 1871-72, from the Society.

Reports of Proceedings of the Agri-Horticultural Society of the Punjab, held on the 13th December, 1870, and 26th December, 1871, from the Secretary.

Reports of the Bengal Chamber of Commerce, for the half-year ending 30th April, 1872, from the Chamber.

Journal of the Asiatic Society of Bengal, Parts 1 and 2, Nos. 1 and 2, Vol. XL., New Series, from the Society.

C. 1, M. 1., de Journal du Jardin Imperial de Botanique de St. Petersburg.

A bag, 1 md. of acclimated peas, raised from imported stock, mixed varieties, from Mr. A. J. Sturmer.

A box of acclimated vegetable and flower seeds from Mr. J. Gouldhawke. In the collection are some seeds of the Gumbur. Mr. G. writes, "It is a well known wood, light, white, and close-grained; serviceable for a variety of uses as it does not warp. If it were better known, it would be more sought for. I hope you will distribute it and also sow some trees in our new garden as it is ornamental and the flowers are sweet scented."

#### COMMUNICATIONS ON VARIOUS SUBJECTS.

Read Letter from Mr. H. J. Rainey, suggesting the experimental introduction of the cocoanut tree in localities in the Sunderbunds where it does not exist. He recommends the introduction of species growing in the Islands of the Bay of Bengal, and in particular the Cocos Islands. Mr. Rainey adds, "If in the opinion of the Society such an experiment is at all likely to succeed, I feel confident that the able and energetic Secretary to the Government of India, in the recently established Department of Agriculture and Commerce, would speedily arrange to get out a sufficient supply of the cocoanut, should a representation be made to him with the view of securing his co-operation in carrying out the scheme."

Read letter from Mr. W. Le F. Robinson, Officiating Commissioner of Rajshahye Division, forwarding two samples of paddy to which allusion was made in the Proceedings of the Society held on the 22nd February last.

The samples were laid on the table, and referred to the Grain Committee.

Read letter from Baron Von Mueller, Director of the Botanic Garden, Melbourne, soliciting lists of useful timber trees and economic plants as supplement to a printed list he encloses.

Agreed that Mr. Scott be asked, obligingly, to assist in the preparation of the list.

Read letter from Colonel Willoughby Osborne, Sehoré, giving the result of his experimental sowings of certain vegetable seeds imported by him from Messrs. Barr and Sugden. Colonel Osborne writes, "the heat, &c., has of course been against the seeds, but still the result has been satisfactory." The seeds of twenty kinds and twenty seeds of each kind, were sown on the 24th May, in pots kept in the verandah, Thermometer 110°. The pots were exposed to the sun for one hour per diem, and on the 2nd of June or on the tenth day, it was found on examination, that 281 seeds out of 400 sown, had already germinated, the kinds sown were varieties of cauliflower, cabbage, knol-khol, turnip, beet, and lettuce. Not a single variety failed. The seeds were sent out wrapped in oil silk and packed in a deal case.

Read letter from Mr. J. Monro, Collector of Jessore, seeking information as to the best kind of grass to cultivate as fodder for cattle, stating that

the inquiry is suggested in consequence of a proposal made by a Native gentleman, that some attention should be devoted to the subject. A reply to be sent, recommending Guinea grass and Sarghum as the best green food for cattle: the former has been extensively used for the purpose. The Society in May 1871 printed a set of directions for its cultivation.

Read letter from Mr. J. F. W. Watson, acknowledging receipt of the Grant Gold Medal awarded him for his Tea Essay, and returning his best thanks to the Society for the handsome gift.

#### SUPPLY OF SEEDS FOR 1872.

Read letter from Messrs. D. Landreth and Son, Philadelphia, advising shipment of vegetable and flower seeds on the 10th May, per ship *British King*.

Read letter from Messrs. Law, Sonner, and Co., Melbourne, advising shipment of field seeds per ship *James Service* as also a case of *Araucarius* for the Society's new Garden at Alipore.

Ordered, that the field seeds from Melbourne be advertised for distribution to members when ready.

#### TERRESTRIAL ORCHIDS FROM THE NEILGHERRIES.

Read the following paper, kindly furnished by Mr. Scott, in correction of his former paper on the subject of the '*little man's bread*' or salap-yielding orchid, which was read at the Meeting of the Society of the 18th April last.

#### Note on the '*Little Man's Bread*' of the Neilgherries.

I take the opportunity to correct a mistake into which I have been somehow led in my first examination of the "*little man's bread*," and a notice of which was published in the Proceedings of this Society for December last. I then stated, that "though the colour of these specimens is much less pure than the *salep musree* of the bazaars, they seem none the less rich in bassorin, so that hard and horny though they be, portions of them immersed in boiling water, readily swell up and acquire a gelatinous character. "I have now repeated this experiment with specimens subsequently sent me by Mr. Blechynden, but, though parings of these do become soft when immersed in boiling water, they certainly do not swell up and acquire a gelatinous character. I can only account for this discrepancy by supposing that I have, by mistake, immersed parings of the coarse sorts of bazaar *salep* (which I had by me for comparison) for those of the '*little man's bread*.' The result has anyhow led me into a great error as to the nature of the substance, which I now find instead of being the product of orchids is that of an underground fungus of the genus *Mylitta*. It indeed seems very closely allied to, if really distinct from, the so-called native bread of Tasmania, *M. Australis*. Fresh specimens of this fungus, says Berkeley, "have a sub-acid



smell and little taste; but we have seen others of an extremely compact horny texture, resembling a mass of sago forcibly compressed into a solid ball." The specimens of the *little man's bread*, submitted by Mr. Whynton, are here very clearly indicated.

#### BRANCHING PALMS.

Read the following notes by Mr. J. Scott, referring to a sketch of a branching date Palm, received from Dr. Thos. Beaumont, Indore.

[See Correspondence and Selections.]

Agreed that the sketch of the branching date palm submitted, be lithographed for circulation to members with the next issue of the Society's Journal.

#### CONCENTRATED TEA FERTILIZER.

Read letter from Dr. Geo. King, Superintendent, Royal Botanical Garden, forwarding sample of a fertilizer specially adapted for tea prepared on a formula by Dr. J. Campbell Brown, an eminent English Chemist, and founded on a careful investigation and analysis of all parts of the tea plant. Dr. King writes that "this eminent English Chemist has for some years been working at the Chemistry of Indian Tea, and I have had the pleasure of supplying him with some of the materials for his researches. Dr. Brown informs me, that during his investigations he was struck by the difference in chemical composition between leaves gathered from healthy well nourished plants and those yielded by starved plants. Dr. B. was led to consider the whole subject of artificial manure for tea, and as the result, he has prepared a formula for a Tea Fertilizer. This formula has been handed over to a firm of manufacturing Chemists in Liverpool, who have prepared a manure in accordance with it. As the formula is founded on a careful analysis of all parts of the tea plant, it is believed that the manure made in accordance with it will be highly useful. This however can only be settled by trial and careful observation of results.

"The Agricultural and Horticultural Society having recently shown an especial interest in tea cultivation, it appears to me they might like to be the medium of introducing the fertilizer to the notice of the tea interest in India, I therefore send a sample herewith. A couple of small barrels of it have been sent to me at Dr. Brown's suggestion, and I shall be happy to make one of those over to the Society for distribution to such of their correspondents as may care to try experiments with it.

"To give experiments practical value, a number of bushes should be selected of pretty equal appearance as regards size and health, and of the same age. Half of these should receive no manure and the other half should be "manured with the fertilizer," and a precise account of the amount of leaf yielded by each set of bushes.

"To facilitate reference to the makers of the fertilizer, I enclose herewith

their circular. It is, I dare say, almost needless for me to say that my interest in this matter is purely a scientific one."

Dr King adds, "I should be very glad to receive for analysis a pound or two of tea made from plants that have been treated with the fertilizer."

*Directions for using the concentrated Tea Fertilizer.*

This Fertilizer is not a drug or stimulant, but simply plant food, and supplies every organic and inorganic element requisite to produce an abundant and healthy growth of the leaves of the Tea Plant, and to enable them to withstand blight and drought. It is also confidently expected that the quality of the Tea will be greatly improved by it. Each tree requires only 4 or 6 oz of the Fertilizer, unless the soil is in a very exhausted state, when 6 or 8 oz may be used. It should be sprinkled in a hollow, scraped close to the stem of the tree, and covered lightly with a little loose earth.

The Fertilizer will be delivered free on board ship at Liverpool, at rates as below. It may be received in Suez Canal, in about 30 days. The present rate of freight is 4 1/2 per ton of 40 cubic feet. Bags, closely packed, measure 33, and Casks 14 cubic feet per ton weight.

The following are our present prices —

	£	s	d	
Put up in 1 1/2 cwt Bags	12	10	0	per ton
" 1 " "	12	12	6	"
" 1/2 " "	12	15	0	"
" 1/4 " "	12	17	6	"
" Casks or Tierces, holding 3 or 5 cwt	12	15	0	"
" 1/2 cwt Bag in tierces	13	0	0	"
" 1/4 " "	13	5	0	"

From the small quantity necessary to be used, it is computed the cost of the Manure, including freight, &c, will not exceed £3 per acre.

Resolved to accept Dr. King's offer of a barrel of the manure for distribution to Tea planters who will undertake to test its value and report the result to the Society.

The thanks of the Society were awarded for the above contributions and communications.

EXHIBITION OF PLANTS, &c.

Read letter from Dr. Geo. King, Superintendent Royal Botanical Garden, sending for exhibition a specimen of the new Chinese cucumber (*Solly qua*). Dr. King writes, "the specimen now sent (3 feet 9 inches) is a very small one, but there is no larger one in this garden at present." I have seen specimens 5 1/2 feet in length, and I have "heard of some measuring 7 feet."

"This cucumber is easily grown, but requires plenty of manure. The plants must be trained upon wall or "trellis-work, and the fruits must be allowed to hang down vertically from the time they set. If this latter point be not attended to, instead of acquiring their natural length, the fruits grow short and thick."

The Rajah Suttayanund Ghosal, Balindoor, exhibited a specimen of *Gladiolus* in bloom.

The Officiating Secretary placed on the table through the kindness of Mr. G. O. Beeby, the seed of the double mango which was exhibited at the last Meeting. The seed, like the fruit, is double, and yet perfectly united at the stem.

Read letter from Mr. Scott awarding marks to the Rajah Suttayanund Ghosal for the "*Higginsia Ghiesbreghtia*," exhibited by him at the last Meeting. Mr. Scott writes, "that the plant was introduced from Kew to the Botanical Garden, whence it has been distributed. As the Rajah however has been the first to exhibit it at your Monthly Meeting, and a fair specimen, I think he might have five marks for it."

#### VACANCY IN THE COUNCIL.

Mr. E. Broughton was appointed to fill a vacancy in the Council by the departure from India of Mr. L. Berkeley.

*Thursday, the 25th July, 1872.*

J. A. CRAWFORD, ESQ., *President in the Chair.*

The Proceedings of the last General Meeting were read and confirmed.

The following gentlemen were elected members.

Messrs. W. Kemble, C. E. R. Girdlestone, H. W. Craigie, H. J. Leitch, H. G. Sharp, R. C. Walker, R. W. Snow, Baboo Nomanath Law and Goonender Nath Tagore, Secretary, Local Committee, Hoshungabad, Major E. G. Clark, Major General Fraser Tytler, Captain Chas. Young, Dr. J. B. White, and Secretary, Public Garden, Mirzapore.

Mr. R. P. Sage intimated his desire to rejoin—agreed to.

The names of the following gentlemen were submitted as candidates for election :

W. Smith, Esq., Dorundah Factory, Chota Nagpore—proposed by Mr. T. F. Peppe, seconded by the President.

G. T. Peppe, Esq., Manager, Dunwar Estate—proposed by Mr. T. F. Peppe, seconded by the President.

P. T. Carnegie, Esq., Assistant Commissioner, Jorehaut,—proposed by Captain L. Blathwayt, seconded by the President.

D. L. Gilmore, Esq., Indigo Planter, Futteghur,—proposed by Mr. E. C. Buck, seconded by Mr. Saml. Jennings.

H. G. Meakin, Esq., Brewer, Kussowlie,—proposed by Mr. S. H. Robinson, seconded by the President.

The following contributions were announced :

The *Flora Sylvatica* for Southern India, Parts XXII. and XXIII., from the Government of India, Home Department.

**Kháná**, a hand book on the Resources of India, by Colonel G. T. Haly, from the Department of Agriculture, Revenue, and Commerce.

Report on the Administration of the Forest Department in the several Provinces under the Government of India, 1870-71, from the Department of Agriculture, Revenue, and Commerce.

Records of the Geological Survey of India, Vol. V., Part II. 1872, 2 copies, from the Bengal Secretariat.

Memoirs of the Geological Survey of India, Vol. VIII, Parts I, and II.

Report of the Bombay Chamber of Commerce, for the year 1870-71, from the Chamber.

Proceedings of the Asiatic Society of Bengal, No. VI., June 1872, from the Society.

Société des Agriculteurs de France—liste générale des membres. Au 1<sup>er</sup> Mai 1872, from the Society.

Seeds of Sunflower and two pints of Sunflower seed oil, from the Chief Commissioner, Mysore.

An assortment of Acclimated Seeds of sorts from the Barrackpore Park.

A collection of 20 pamphlets from the Royal University of Norway, Christiania.

#### WINGED PADDY.

The following report was submitted from the Special Grain Committee, on the samples of paddy from the Rajshahye Division, referred to at the last meeting :

"On enquiry, I find, that both these sorts of Paddy are cultivated in Backergunge, Dacca, Cuttack, and other places, more specially for local consumption. When Ballam sells at Rs. 2, these would sell at Rs. 1-8. Both these yield a sort of coarse rice. The winged ones are called "Pakhiraj," and the other "Banshibeer."—S. N. GHOSAUL.

"I shall be able to give an opinion when a portion of the paddy is converted into rice."—P. C. MITTAL.

Ordered—That the report of the Grain Committee be forwarded to E. W. Moloney, Esq., Commissioner, Rajshahye Division, (And as these varieties of paddy appear to be well known in other districts and are not desirable kinds, it was not thought necessary to prosecute the enquiry further.

Read letter from Officiating Secretary to Chief Commissioner of Mysore, sending for acceptance by the Society one seer of the seed of the Sunflower, (*Helianthus Annuus*) plant, grown at Mysore, together with two pints of oil expressed from the same. Forty seers seed yielded one gallon of fine oil.

The Officiating Secretary also placed on the table a small phial of Sunflower seed oil from the Agricultural Society of Satkhira, soliciting report on its quality, also hints on the culture of the plant and manufacture of the oil.

Resolved—That the thanks of the Society be conveyed to the Chief Commis-

sioner for the presentation, with a request to be furnished with particulars as to yield of seed per acre, and at what price the oil can be produced.

Also to endeavour to obtain in Calcutta a reliable opinion of the value of the oil.

#### CALIFORNIA BROOM, CLOSELY ALLIED TO THE SORGHAM.

Read letter as follows from Mr. A. Whitten :

I send a plant grown from seed procured from your Society. The seed was given me as a novelty. I know it only as "California Broom."

I planted the seed in patches of about two feet diameter, in March or April. Unfortunately I forgot, and made no note of the exact date, and it germinated freely. I have devoted no special care to its cultivation, not even in giving it an occasional dressing of fresh earth. Its progress, in ordinary soil was so vigorous, it seemed to need no attention.

The length of the plant I now send measures, from the root to the top of the broom, eleven feet.

The Officiating Secretary stated, that the seeds of the California Broom were originally presented to the Society by Mr. R. M. Daly.

The specimen exhibited by Mr. Whitten appears to be the same as the ordinary Sorgham.

#### TEA FERTILIZER.

The Officiating Secretary stated, that Mr. Leslie H. Mooney, the Manager of the Hurbunswalla Tea Factory, Dehra Dhoon, had applied for some of the Tea Fertilizer offered by Dr. King for experimental purpose, and promises to report to the Society on the use of it. Mr. Mooney enters into a figured statement of the cost of collecting and carting cow manure which he estimates at from 8 to 10,000 Rs. annually, and states that if the Tea Fertilizer proves more effective in its application than cow manure, and at no greater cost, it will prove a great boon.

Officiating Secretary reported receipt of a barrel of the Fertilizer.

Agreed to give a portion to Mr. Mooney for trial and report.

#### WINDMILL.

Read letter from Mr. J. C. Macdonald, requesting information regarding irrigation by wind power. Read also correspondence with Mr. Harris and Colonel Wintle as to the Windmill sent to Dum-Dum for trial.

It was decided to accept the Windmill, offered by Mr. Harris, with thanks, and as it is still at Dum-Dum, to bring it to the Metcalfe Hall compound, and to obtain an estimate of the expense for the proposed alteration.

#### VARIOUS COMMUNICATIONS.

Read letter from Lieutenant-Colonel Haig, requesting to know where he could procure a few hundred maunds of Carolina seed paddy, of reliable quality, to

meet an urgent application from the Commissioner of Orissa, to replace the great destruction caused in that district by recent floods.

The Officiating Secretary reported that Colonel Haig was informed, his requisition could not be complied with—as the Carolina paddy was not found suitable for Bengal, and its cultivation having been abandoned, seeds were no where procurable.

**JESSORE TOBACCO.**

Read letter from Officiating Commissioner, Presidency Division, giving cover to a communication from the Deputy Officiating Collector, Jhenida, with a sample packet of tobacco grown in the district of Jessore, raised from Virginia tobacco seed, and requesting to be favored with an opinion on its quality.

Referred to the Tobacco Committee for report.

**SEEDS AND PLANTS.**

Read letter from Messrs. Vilmorin, Andrieux, and Co., of Paris, advising shipment of the Society's annual supply of vegetable and flower seeds, per Steamer *Wineslead*, via Suez Canal.

Read letter from Messrs. Law, Sonmor, and Co., Melbourne, advising shipment per P. and O. Co.'s Steamer of a case of rose plants for the Society's New Garden at Alipore.

Ordered—That all the Roses be kept to stock the Society's New Garden.

The thanks of the Society were accorded for the above contributions and communications.

*Thursday, the 22nd August, 1872.*

**J. A. CRAWFORD, Esq., President, in the Chair.**

The proceedings of the last meeting were read and confirmed.

The following gentlemen were elected members.

Messrs. W. Smith, G. T. Peppe, P. T. Carnegie, and H. G. Meakin.

Lieut.-Col. G. C. Hawkin, Segowlee, intimated his desire to rejoin. Agreed to.

The names of the following gentlemen were submitted as candidates for election.

Captain W. Rust D'Eye, landholder, Sonakhan, Belaspore,—proposed by Mr. W. Dodgson, seconded by Mr. J. H. Hutchison.

W. Campbell, Esq., landholder, Sonakhan, Belaspore,—proposed by Mr. Dodgson, seconded by Mr. Hutchison.

Charles H. Pope, Esq., Planter, Singhia Factory, Hadjeeepore,—proposed by Officiating Secretary, seconded by Mr. W. Stalkartt.

Gore Ouseley, Esq., Commissioner, Umballa, — proposed by Col. S. C. D. Ryder, seconded by the President.

Herbert Reilly, Esq., Deputy Magistrate, Maldah,—proposed by Mr. E. V. Westmacott, seconded by the President.

Deputy Bheel Agent, Maunpore, Mhow,—proposed by Dr. Thos. Beaumont, seconded by the President.

John Thomson, Esq., Merchant, Calcutta,—proposed by Mr. A. R. McIntosh, seconded by Mr. S. Jennings.

Robert Hart, Esq., Planter, Heroncherra Garden, Cachar,—proposed by Mr. A. R. McIntosh, seconded by Dr. Tonnerre.

James Peter, Esq., Planter, Lydiacherra Garden, Cachar,—proposed by Mr. A. R. McIntosh, seconded by the Officiating Secretary.

R. Macalister, Esq., Merchant,—proposed by Mr. G. M. Blacker, seconded by Mr. W. Stalkartt.

C. G. Browning, Esq., Director of Public Instruction, Oude,—proposed by the President, seconded by Mr. W. Stalkartt.

The following contributions were announced :

Hand-book of the Manufactures and Arts of the Punjaub, by B. H. B. Powell, Esq., from the Author.

Report of the Sanitary Commissioner for Bengal, for the years 1870-71, from the Government of Bengal.

The Flora Sylvatica for Southern India, Part XXIV., from the Government of India.

Memors of the Geological Survey of India, Vol IX., Part I., from the Superintendent.

Records of the Geological Survey of India, Vol V., Part III., from the Superintendent.

Translation of Don Rafael Zaragoza's paper on Tobacco, its cultivation and preparation in the Philippine Islands, 2 copies, from the Government of India.

Proceedings of the Asiatic Society of Bengal, No. VII., July 1872, from the Society.

Proceedings of Meeting of the Committee of the Madras Agri-Horticultural Society, held on the 3rd January and 14th February last, from the Society.

List of prizes to be awarded at the Annual Exhibition of the Madras Agri-Horticultural Society to be held early in February 1873, from the Society.

Report of Meeting of the Punjaub Agri-Horticultural Society, held on the 7th January, 1871, from the Secretary.

Report of the Royal Botanical Garden, for the year ending 31st March 1872, from the Superintendent.

Tenth Annual Report on the Government Cinchona Plantations in British Sikkim, for the official year ending 31st March 1872, from the Superintendent, Royal Botanical Garden.

Pamphlets by Lt.-Col. A. F. Corbett, Nos. II. and XV., entitled "Is Irrigation necessary in Upper India" and pamphlet entitled "Irrigation not necessary in

## *Proceedings of the Society.*

Upper India," from the Author.

A small box of Bamboo seeds from W. C. Taylor, Esq., of Cuttack.

### SUNFLOWER OIL.

The Officiating Secretary not having succeeded in obtaining any report in Calcutta on the uses or value of the specimens submitted at last Meeting, it was agreed that a sample should be sent home to the Secretary now in England with the view of obtaining the required report and valuation there.

### DISTRIBUTION OF ORNAMENTAL PLANTS AND FRUIT GRAFTS.

Read correspondence with Government, conceding the request of the Society to extend the existing arrangement for the supply of ornamental plants to its members to the end of February, 1871, and for the supply of fruit grafts for some longer period.

Resolved that the thanks of the Society be returned to Government for the concession.

### COMMUNICATIONS ON VARIOUS SUBJECTS.

Read letter from Mr. J. L. Atkinson, of Barreepuddah, soliciting information and assistance in obtaining cuttings of mulberry tree, and silk worm eggs for the purpose of establishing a filature at Barreepuddah, in the District of Balasore.

Mr. Atkinson not being a member of the Society, the Council recommended his being referred to any member engaged in the manufacture of silk for the assistance he requires, which was adopted.

Read letter from Dr. Wood, Secretary, Public Garden, Azimghur, soliciting instructions for laying out, as an ornamental garden, a piece of land lately reclaimed.

The requisition to be complied with.

### CULTIVATION AND PREPARATION OF TOBACCO.

Read letter from Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, giving cover to two copies of a translation of a Spanish pamphlet, describing the cultivation and preparation of tobacco in the Philippine Islands.

As this appears to be a valuable paper, was resolved to ask permission of Government to republish it in the Society's Journal.

### ON IRRIGATION IN INDIA.

Read letter from Lt.-Col. A. F. Corbett, sending copies of his publications, entitled "*Is Irrigation necessary in Upper India,*" and "*Irrigation not necessary in Upper India,*" and the questions treated on being of "vital importance to the country," suggests their republication in the Journal of the Society.



Referred to the Committee of Papers.

STILLINGIA SEBIFERA OR TALLOW TREE.

Read letter from Mr. John Powell of Rosa, Shahjehanpore, as follows.

"I have been desirous of obtaining some information as to the best means of extracting the products from the Tallow Tree seed, but those to whom I have applied could not assist, and I have thought that an application to you would be attended with more success. Having nothing to guide me, I made some trials on it and first mashed the entire seed, one portion was boiled, the other pressed "Cold drawn," the boiled portion gave a substance resembling Tallow which the heat of the sun is not sufficient to liquefy. The cold drawn gave a cloudy substance, which, after being allowed to rest, resolved itself into a limpid oil and white opaque flakes which gradually subsided.

"This being unsatisfactory I put the seed in boiling water, and then by fretting it whilst very hot over a rough surface, readily separated the outer portions, the black seed being then clean, it was dried and passed through two rollers properly adjusted, and I had the satisfaction of seeing the shell crack readily, leaving the kernels free and entire, the shell having been separated by sifting, the kernels were treated and pressed in the usual way, cold drawn, and the result proved to be a limpid oil without smell and nearly free from taste, the only taste being an agreeable one, being slightly sweet.

"The return of oil was  $\frac{1}{4}$ th of the weight of seed, the Tallow is in excess.

"The weight of shell is about  $\frac{1}{3}$  of the whole, the remainder being oil or Tallow.

"This fatty substance will not liquefy or dissolve readily.

"The oil burns well.

"Is it ever used as food? I tried a little and it caused nausea.

"What probably would be the market value?

"Do you care for samples of the oil and Tallow.

"In the Kumaon Hills, there is a good deal of Tallow tree cultivation about some of the Tea Gardens, and judging from the way in which some trees are laden, I infer that it might be found profitable to work up the produce."

Agreed that a copy of Dr. Macgowan's paper published in the Society's Journal in 1840, be sent to Mr. Powell.

AMERICAN VEGETABLE AND FLOWER SEEDS.

Read extract from Mr. Scott's letter, wherein he says: "The American seeds seem to be in good order. I have sown a portion of each and shall let you know how they germinate."

REPRODUCTION OF PLANT BY LEAF PROPAGATION.

Read the following interesting account from Mr. C. E. Price on the subject of reproducing plants by leaf propagation.

"As the subject of leaf propagation, which is considered the highest standard, may be interesting to many and deemed worthy of attention I send you an account of my experience with a leaf of a *Pittonia*

"During first week of November, 1871, I obtained a leaf of the *Pittonia Verschaffeltii*, the mid rib and veins of which I cut through in several places with a penknife, and placed it on silver sand burying the foot stalk by it, the leaf being kept well pressed down with two thin slips of bamboo firmly secured by small pegs and then covered it with a bell glass. Care was taken to keep the sand sufficiently moist so as to prevent the leaf from either drying up or rotting."

"For months I observed the leaf looked fresh and although it did not show signs of active life, no symptoms of decay were apparent and I waited the issue with it until at last at the commencement of this month (or nine months after it was put down) it burst into growth at one of the incisions. The young plant looks in a healthy state, and I send it as it stands for exhibition.

Beginners need understand the better examples of the facility of this mode of propagation and I have often tried it then I have in a similar manner with most satisfactory results having had so many as six and seven plants from a single leaf but this is my first attempt with a *Pittonia*.

"*Gloxinas* may also be propagated in this way. In fact I am informed that under artificial treatment &c. in which uses only bottom heat &c. and in suitable conditions the leaves of a large number of plants possess this power of reproduction."

The thanks of the Society were awarded for the above contribution and communications.

#### EXHIBITION OF PLANTS

Mr A. Rogers exhibited a new *Amoranthus*, *Silicifolius* with long drooping leaves.

Mr C. I. Price exhibited a new and curious *Poinsettia* raised from seed.

Two new *Zestras* the *Indica* and the *terminalis* and the new *Passiflora* '*Tyrsicoides*' of which last Mr W. Bull of Kings Road Chelsea gives the following description.

"*P. tyrsicoides*. A charming ornamental foliage, chamber each leaf being intersected with three distinct broad bay of rose colour which in a young state are white, changing to rose. This beautiful variety is in reality a handsomely variegated foliage Passion Flower."

Agreed that Dr. Jenner and Mr Samuel Jennings be appointed Judges to award the necessary marks to which these exhibitors are entitled.

#### VACANCY IN THE COUNCIL

Read letter from Dr Geo King, resigning his seat in the Council, owing to his being compelled to proceed to England on sick leave.

Agreed that Mr. A. Rogers be elected to fill the vacancy and to be a member of the Garden Committee.

*Thursday, the 19th September, 1872.*

J. A. CRAWFORD, Esq., *President, in the Chair.*

The proceedings of the last meeting were read and confirmed.

The following gentlemen were elected members:

Capt. W. Rust D'Eye, W. Campbell, Esq., C. H. Pope, Esq., Gore Ouseley, Esq., Herbert Reilly, Esq., Deputy Bheel Agent, Maunpore, John Thomson, Esq., Robert Hart, Esq., James Peter, Esq., R. Macalister, Esq., C. G. Browning, Esq.

Lieut.-General, Sir E. Huthwaite, K. O. B., and A. Chrestian, Esq., intimated their desire to rejoin. Agreed to.

The names of the following gentlemen were submitted as candidates for election:

Dr. N. B. Baillie, Civil Surgeon, Bhaugulpore,—proposed by Mrs. Annie Sandys, seconded by Mr. V. Taylor.

Deo Zander, Esq., Merchant, Calcutta,—proposed by Mr. Henry A. Gray, seconded by Mr. J. G. Muegens.

Rajah Sunbhee Narayana Sing, Bewar,—proposed by Mr. Ralph Griffith, seconded by Mr. S. Jennings.

J. Sykes Gamble, Esq., B. A., Asst. Conservator of Forests, Cooch Behar,—proposed by Mr. R. Redpath, seconded by the President.

Deithalm Freck, Esq., Merchant, Calcutta,—proposed by Mr. S. H. Robinson, seconded by Mr. A. Rogers.

Alan Cadell, Esq., c. s., Mozuffernuggur, N. W. P.,—proposed by Mr. E. Buck, seconded by the President.

Bennayk Rao Kibia Sahib of Indore,—proposed by Dr. Beaumont, seconded by the President.

W. H. D'Oyly, Esq., c. s.,—proposed by Mr. S. H. Robinson, seconded by the President.

Supdt., Central Prison, Benares,—proposed by Dr. R. H. Perkins, seconded by Mr. S. H. Robinson.

The following contributions were announced:

The Flora Sylvatica for Southern India, Parts XIX., to XXIII. from the Department of Agriculture, Revenue, and Commerce.

Pamphlet entitled "Select Plants eligible for Victorian Industrial Culture," by Baron Fred Von Mueller, from the author.

Proceedings of the Asiatic Society of Bengal, No. VIII. for 1872, from the Society.

Report on the progress and condition of the Royal Gardens at Kew, during the year 1871, from Dr. Hooker, the Director.

Report on Meteorology, Museum, and Horticultural Gardens, in the Province of Oudh, for 1871-72.

Report of the 20th Annual General Meeting of the British Indian Association, held on the 14th March, 1872, from the Association.

Report of Meeting of the Agri-Horticultural Society of the Punjab, held on the 22nd February, 1872.

JESSORE TOBACCO.

The following report was submitted from the Special Tobacco Committee on the samples of Tobacco grown in the district of Jessore, submitted at the July Meeting.

"I have examined the tobacco submitted by the Offg. Commissioner, Presidency Division, and I am of opinion that the sample is of very little value for the foreign market. It is not equal in my opinion to the Sirsa Morung and Kullinga."

"The sample of Tobacco before me is of a coarse description though, grown from imported seeds of Virginia Tobacco. It has no aroma whatever and the midrib is too thick to render the tobacco fit for snuff or for smoking purposes. As for taste, it has none. The price it would fetch in Calcutta would be from 3 to 4 Rs. per maund for mixing with Sirsa or Kullinga. It is unfit for exportation and could only find a sale for local consumption."—C. FABER TONNERRE.

"I concur in the above opinion. The sample is much inferior to ordinary Rungpore and Patna descriptions; its present value would be about Rs. 4 per maund"—ED. VANCUTSEM.

"The samples, three in number, which have been shown to me are merely dried leaves of Tobacco, and the tobacco is not cured or made. The leaves are the Virginian long leaf and are much shorter in length and less in substance, or less weighty, than they would have been if the plants, which produced them had been grown in good rich soil. The leaves seem to have been properly dried. The packet marked W. Fyfe, Esq., is the best and appears to have been allowed to ripen properly, and the leaves have been dried properly; but the other two are not as good and have not been allowed to ripen properly before drying. As the leaves are now, the tobacco is not a marketable commodity. The tobacco is far better in taste than the common native tobacco, though it has not much strength, as it is only dried leaf, or in the first process. The leaves ought now to be hang up and allowed to imbibe moisture and then made into hands and then packed so as to allow the tobacco to ferment and become cured, and after that, both the aroma and the narcotic properties would be found in it. The method of curing or making tobacco is not generally known, and it is for this reason only that all tobacco produced and submitted for opinion is found to be wanting in strength and wholly without aroma."—WILLIAM SWINHOE.

CULTIVATION AND PREPARATION OF TOBACCO.

Read letter from Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, granting permission to reprint in the Society's Journal, the translation of the Spanish pamphlet referred to in the Proceedings last month.

VARIOUS COMMUNICATIONS

Read letter from the Secretary to the Chief Commissioner of Burma asking for information on the growth and cultivation of Potatoes in India.

Ordered, that spare Nos. of the Society's publications containing the required information, be offered at the rates usually charged for spare copies.

Read letter from Deputy Commissioner of Amoy, asking for seeds of the Cereus Lanatus (*Cereus Lanatus*).

The Officiating Secretary reported that Captain Lovell, of the P. & O. Company, has obligingly promised to enquire for the seeds and if procurable will obtain and send a supply.

Read letter from Lieut. Col. Corbett asking information about the Plantain stocks or trees as food for cattle, and particularly to know if such food would be injurious to cattle.

The opinion of the Meeting was, that such food would in no way be injurious.

SILK WORMS

Read letter from Mr. G. DeCristoforis on the subject of rearing Silk worms as follows:

"I write again to you from Hely on the subject of Silk worm rearing knowing that you will be glad to receive in the Proceedings of the Agricultural and Horticultural Society any communication which may be interesting and perhaps useful to the Silk worm rears and Silk manufacturers of Bengal at a time particularly when this important produce is on the decline in that country and when it is visibly necessary to improve on the old system of rearing, and to introduce into the country a Silk worm (the Japin) which is so greatly successful in other countries as to render now Bengal Silk an article generally neglected in our European markets.

"Before entering into the subject I will point out to you how the Japin Silk worm eggs are now brought into Europe, at a much lower price than in former years, when they were paid 25 to 35 francs per card, while last year they were to be had from 8 to 15 francs which prices are not likely to rise again, as now the grainers find much difficulty in securing subscribers, and must therefore provide cheap cards, so as to be able to compete in the open market.

"The quality of the eggs seems also to be more carefully selected by the natives of Japan, as we had this year almost no involute species in them, while in former years they were often passed by fraud amongst the annals.

"It is my opinion that the Japan Silk worm-eggs which were sent on various occasions to Bengal to be experimented upon were all hyaline, as I quite remember how the worms were too precocious in coming to maturity, and how they and the cocoons were small in size comparatively with those we produce here. By making timely arrangements with a firm in Yokohama, or better with some of the Italian growers it would be easy to have good cards landed at Ceylon or Calcutta by the end of October, and on their arrival these might be sent at once up to Durrachung till the end of January (for the reasons already stated by me before your Society) when it would be time to have them brought back into Bengal securing in this way a simultaneous hatching, which was just one of the greatest difficulty with these eggs in the previous trials made there.

'I will now relate to you the particulars of my own Silk worm rearing in Lombardy during the last season, observing to you before all that I chose the village of Inverio (ten miles above Arona on the way to Orta) for the reason of having found at the place facilities for getting mulberry leaf, as the peasants here since the Silk worm disease use to sell it in preference to rearing the worms and also because I found at the place a small hut where which I wanted to rent. I was therefore quite new to the place, had no support from my own land everything to buy at comparatively higher prices, and was entirely in the hands of mercenary landlords who could not have more at heart my interest than their own, and these you will admit, were no small obstacles to a Silk worm rearing.

'It is therefore in this village that towards the end of April, I bought 12 cards of annual Japan eggs, which by the 3rd of May were all successfully hatched. I had towards the end of my rearing, much difficulty in securing the mulberry leaf I still wanted, as the leaf made so little growth everywhere on account of the coldness of the weather, that many people come here to buy leaf, paying for it more than double the price paid at the beginning of the season. I had also to contend against the most inclement weather, almost continually cloudy or rain and so cold as to have the thermometer often as low as 60 degrees F., while it should have been from 70 to 80, a reason for which we had a partial failure in the crop of most districts of Lombardy.

"Notwithstanding this and the badly selected buildings I had, I carried on my worms with no great losses, and by the beginning of June, i.e., within 32 days of their hatching, the worms were all spinning their cocoons.

"By the account herewith annexed (p. 22, 26) kilos of cocoons per card 800 of these cocoons would weigh a kilo while it would take 1,700 to 1,800 Bengal cocoons for the same weight) you will observe that I have been fairly successful, although one having good houses to rear the worms in fair weather, but principally good cards, can expect to have a crop averaging from 35 to 40

kilos of cocoons per card, and often times more. You may also judge how much more remunerative can be Silk-worm-rearing to a man who has his own mulberry, his houses, fire-wood, twigs, and his own peasants to rear for him who get no fixed pay, but a percentage on the crop. For a native of Bengal the profits may still be higher, and more certain, considering that they are all small reavers, employing the hands of their own family; that they can get all that is necessary to the rearing at a cheaper cost than here, and that they have the immense advantage of being certain of a good and dry weather, while the rearing would last with them nearly a week less than in this country. And such advantages are not to end with the rearer, but would give a crop which would place its Silk on an almost equal footing with our European produce, and certainly above China and Japan's, as with the European management, and good systems of spinning we have in Bengal, and with spinners that in my opinion are equally good to the Italians, Silk could be reeled, that would compete for quality and cost to any other from other countries, while at present it is much neglected, and has only a temporary demand, when prices for European Silk are holding very high.

"I shall be glad to furnish, if required, any further information on this subject, if the matter is taken up by any one not with a spirit of criticism, but for public utility."

*"Account of the rearing in Lombardy of 12 Cards of Japan  
Annual Silk worm-eggs in the Season 1872."*

12 Cards at Fs. 9-70	...	...	...	Fs.	116-40
9,100 kilos of Mulberry leaf, at Fs. 8-35 per %	...	...	...	"	759-85
Twigs (dry heath) for the worms to spin the cocoon in	...	...	...	"	105-70
House rent from 1st May to 15th June, at 80 Fs. per month	...	...	...	"	120-0
Headman for 47 days, at Fs. 3 per day	...	...	...	"	141-0
Women for 225 days, at 80 cents. per day	...	...	...	"	180-0
Men for 52 days, at Fs. 1-50 per day	...	...	...	"	78-0
4,500 kilos of wood, at Fs. 2 per %	...	...	...	"	90-0
Paper, light, &c.	...	...	...	"	76-65
					1,667-60

PROCEEDS.

319 kilos of cocoon, i. e., k. 26½ average per card, at Fs. 7 per kilo	Fs.	2,233-0
17 kilos rejections, at Fs. 220 per kilo	...	37-40
Sale of Stock and Silk worm-mauure	...	65-0
		2,335-40

Which gives a net profit of Fs. 667-8."

Thanks were accorded to Mr. De Cristoforis for the above interesting paper.

CULTIVATION OF SORGHUM.

Read letter from the Assistant Secretary, Government of Bengal, forwarding copies of Colonel Boddam's revised paper on the cultivation of Sorgho as a forage plant.

SILK CULTIVATION IN INDIA.

Read letter from Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, forwarding copies of Mr. Secretary (Jeoghegan's) account of Silk Culture in India, together with extract from the Proceedings of Government of India thereon.

Ordered, that the above two communications be referred to the Committee of Papers, with the view to their publication in the Society's Journal, either in *extenso* or by extract, and that in the meanwhile the sanction of Government be obtained for such publication.

COMMUNICATIONS ON VARIOUS SUBJECTS.

Read letter as follows from W. Gregory, Esq., Her Britannic Majesty's Consulate for Taiwan, Formosa :

" Having been for some years resident in Formosa, (formerly as Vice Consul at Tamsuy, and now as Acting Consul at Taiwan), and having come to take interest in tropical Agriculture and the allied subjects, I shall be glad to obtain any information that you may kindly see fit to give me concerning the operations and publications of your Society, and its conditions of membership, &c.

Here, in Formosa, the following are the most notable articles of produce :—

*Rice*—

*Sugar*—(Chiefly in the South.)

*Tea* (In the North) (cultivation rapidly increasing.)

*Indigo*—Ditto.

*Rheea*—(Boehmeria) ditto.

also sweet potatoes, ground nuts, tobacco, beans, fruit, &c., &c. Scarcely any cotton, and no opium worth mentioning. Turmeric and sesamum seed appear as exports from the Southern ports, but I do not yet know much about them.

" Camphor trees abound in the forests of the interior, and the pith-paper plant (*Aralia papyrifera*) grows wild, at least in the North.

" Fully irrigated rice fields yield two crops a year, but in the southern and central parts of the island, there is much rice land which seems only to have a summer and autumn irrigation (by grace of the summer rains), and this yields only one crop of rice, which is planted out in or about July ; the ground being often planted with other crops in the earlier part of the year.

" There is a dry-ground or upland rice, grown without irrigation. I have seen it not far from Tamsuy, and it is said to be cultivated by the wild aborigines of the mountains. It perhaps requires a damp climate.

" There are various fruits. I will mention the oranges, (of which there are



at least two excellent kinds; one is a large sort with thin and loose skin, called "Se-lq-kan," highly esteemed by the Chinese, and the pineapples, which are excellent."

The Officiating Secretary stated that a copy of the Code of Bye Laws had been sent to Mr. Gregory.

Read letter from Mr. C. T. Burke, Assistant Executive Engineer of Irrigation, asking 1<sup>st</sup>, for a classified list of artificial manures; 2<sup>nd</sup>, kinds suited for various different kinds of crops; 3<sup>rd</sup>, names of places from where such manures are procurable; 4<sup>th</sup>, cost per ton of each different manure laid down at Bombay; 5<sup>th</sup>, quantity sufficient for one acre of each kind of crop; 6<sup>th</sup>, how often would it be necessary to manure the land for each different crop; 7<sup>th</sup>, when advisable to give a different crop after reaping the fruit; 8<sup>th</sup>, when advisable to let the land lie fallow.

Referred to Dr. Tommerre with a request that he will kindly furnish the information required.

#### TEA BLIGHT.

Read extract of a letter from the Assistant Manager of the Moran Tea Company, Cuchar, as follows:

"This season I have had a considerable loss of leaf through the young shoots being partially eaten by some insect. I have observed these depredations every year since I joined tea, but have never seen anything like the loss that has been caused here this season. So serious is it that I estimate a loss of at least a maund of tea from this flush alone, which I am now plucking, and the loss on the entire year must be very serious. For a long time I could not find out what insect was causing the damage, but now I know and have ample proof, as I have repeatedly caught them in the act. It is a small red bug or beetle, several of them which I caught actually eating the young pekoe shoots (they only attack the very youngest and tenderest shoots) I send down to you per Banghy Post, along with specimens of the shoots eaten by them, and I shall be glad if you would submit them to the Committee of the Agricultural and Horticultural Society, to determine what they are, whence they proceed, and if there are any means of exterminating them, so injurious have they been here that I have offered a reward of a pie for every one that the coolies catch. The subject is of interest to every tea planter, for I have scarcely ever seen a garden yet which was not subject to them more or less, although I have never, before, seen a garden so bad with them as this one, yet other gardens may become equally infested with these insects, and the loss in the aggregate must be very heavy. Many planters, however, are not aware of the great damage caused by these pests, for nothing but constant watching will bring it to notice, the insect eats or gnaws only a small portion of the stem of the young shoot, which, whenever the sun touches it, withers, droops, and in about a day falls off and

then the shoot looks just as if it had been plucked; so that to discover the entire depredations of this little pest, the bushes have to be examined once or twice every day. Last year I think it was that some Cachar planters sent down to the Agricultural and Horticultural Society some bugs which were said to infest tea plants and do some damage. These were sent home for examination and report, and the report submitted afterwards was that they were perfectly innocent of having caused any damage; but with regard to the specimens I now send down, nothing of the kind can be said, for, as I have said before, I caught them actually eating the shoots and I do not think there are ten per cent. of the plants in the garden, but what have suffered more or less, each flush, and the average damage is, I think, from three to five shoots per bush cut and spoiled each flush. The Agricultural and Horticultural Society asked, I think, for other specimens of bugs, &c., infesting tea plants to be sent to them, and if you are a member, I shall be glad if you will send in these and find out all about them, particularly if there are any means of getting rid of them."

Resolved, that half of the specimens be sent to Dr J. Anderson, Curator of the Asiatic Society, and half to the Secretary, in London, with the view to procuring reports thereon.

The thanks of the Society were awarded for the above presentations and communications.

#### SURPLUS FRUIT GRAFTS.

At the recommendation of the Council, it was agreed to offer, at cost price, to members, a certain number of mango grafts from Malda, and large fruited Loquats from Agra surplus after completing the planting of the Orchard in the Society's new Garden at Alipore.

#### MARKS AWARDED.

Mr. C. E. Price, two marks for the *Fillonia*, exhibited at the last meeting, reproduced by leaf propagation, and Mr. A. Rogers, five marks for the *Amaranthus Salicifolius* exhibited by him.

Thursday, the 21<sup>st</sup> November, 1872.

J. A. CRAWFORD, Esq., President in the Chair.

The proceedings of the last meeting were read and confirmed.

The following gentlemen were elected members :

J. Sykes Gamble, Esq., W. H. D'Oyly, Esq., Allan Cadell, Esq., Dr. N. B. Baillie, Leo-Zander, Esq., Dietholm Freck, Esq., Rajah Sumbho Narayana Sing, The Superintendent, Central Prison, Benares, and Bensaik Rao Kibia Sahib.

The names of the following gentlemen were submitted as candidates for election :

Nawab Wuzeer Ally, of Gya,—proposed by Mr. C. M. Jerdon, seconded by Mr. S. H. Robinson.

A. Campbell, Esq., Tea Planter, Selim Tea Estate, Kurseong,—proposed by Mr. J. G. Mengens, seconded by Mr. C. F. Inskipp.

Lalla Monohur Doss, Banker, Allahabad,—proposed by Mr. Samuel Jennings, seconded by Mr. S. H. Robinson.

Arthur Bosanquet, Esq., C. S., Judge of Ahmudnuggur,—proposed by Major F. Lukin, seconded by the President.

Revd. H. J. Harrison Tollygunge,—proposed by Baboo Peary Chand Mittra, seconded by the President.

Brigadier General W. J. F. Stafford, Commanding Eastern Frontier, Shillong,—proposed by the President, seconded by Dr. C. F. Tonnerre.

Kuywar Irshad Ali Khan, Land-owner, Sadabad, Muttra,—proposed by F. S. Grouse, Esq., seconded by the President.

E. Skinner, Esq., Tea Planter, Cachar,—proposed by Dr. Tonnerre, seconded by Mr. S. H. Robinson.

Meer Mahomed Ali, Zemindar, Furreedpore,—proposed by Rajah Suttayanund Ghosal, Bahadoor, seconded by Baboo Peary Chand Mittra.

The Hon'ble Arthur Hobhouse, Legal Member of the Supreme Council,—proposed by the President, seconded by Mr. S. H. Robinson.

The following contributions were announced :

Journal of the Asiatic Society of Bengal, Vol. XLI., Part I., No. II., and Part II., No. III., from the Society.

The Flora Sylvatica for Southern India, Part XXIV., from the Department of Agriculture, Revenue, and Commerce.

Brief Account of the Tusseh Silk-worm, with drawings of the insect, by Surgeon J. Short, from the Author.

Seeds of the *Dalbergia Latifolia* (rose-wood tree) from J. V. Sturt, Esq., Assistant Commissioner, Jhansie.

Seeds of the "Nahor," an Assam Forest Timber tree, and Tea seeds, from Samuel Jennings, Esq.

A few seeds of the "Hen and Chicken" Zinnia, from C. E. Livesay, Esq.

#### RECOMMENDATION OF COUNCIL

Read letter as follows, from Mr. P. J. Hay, of Meassampore, Cachar :

"At a meeting of the Stewards of the Cachar Mela, on the 16th instant, it was resolved that an exhibition of flowers, fruit, and vegetables be held in connection with the yearly Mela.

"Great interest is now taken in the rearing of flower, fruit trees, &c., on many Tea Gardens, and we hope that this yearly exhibition will be the means of

increasing it. To induce exhibitors, I hope the Society will give a few medals, as prizes, and we shall be glad to carry out any hints or suggestions you may offer in connection with the proposed Exhibition."

On the recommendation of the Council it was agreed to comply with this request, on the grounds of its being an infant Society, and that three Bronze Medals be granted for Flowers, Fruit, and Vegetables respectively.

COMPTON'S PATENT MANURE.

Read letter from Under Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, forwarding half a ton of Messrs. Compton & Co.'s patent Animal Guano for experimental purposes, with a request that the results of the trials be carefully noted, and the Government of India favored with a report thereon. The letter was accompanied by the following instructions :-

"This manure may be scattered over the surface, or placed round the roots of plants, at an average of three hundredweight to the acre, and the land well irrigated, so that the substance of the manure may be well disseminated through the soil and descend to the roots of the plants, such as Tea or Cotton. If for green crops, such as Maize or Lucerne, it may be thrown broadcast after being well damped."

Agreed to bring this to the notice of Tea planters, and that 1½ cwt. or sufficient for half an acre, be allotted to such of them only as will engage to report results of experiments to the Society.

ACCOUNT OF SILK IN INDIA.

Read letter, as follows, from J. Geoghegan, Esq., Under Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce.

"I am directed to acknowledge the receipt of your letter dated 27th Ultimo, and in reply to say, that the Governor-General in Council places the "Account of Silk in India" entirely at the disposal of the Society, with full liberty to reprint any portions of it which it may be considered desirable to reprint.

"I am permitted to take this opportunity to express my own obligations in the matter to the Society, whose Journals have very largely contributed to the material of the compilation, and to beg your kind assistance in the endeavour to remedy the faults of omission and commission of the present edition."

Referred to the Committee of Papers.

CULTIVATION OF TOBACCO IN BRITISH BURMAH.

Read letter from Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, soliciting compliance with a request from the Secretary to the Chief Commissioner of British Burmah, for a supply of fresh seeds of the finer kinds of Tobacco.

The Officiating Secretary mentioned, that small quantities of six different varieties of fresh Tobacco seeds recently imported from America were sent to the Chief Commissioner on the 28<sup>th</sup> Ultimo.

#### REVISED PAPER ON CULTIVATION OF SORGHO.

Read letter from Officiating Junior Secretary to the Government of Bengal, intimating the sanction of His Honor the Lieut.-Governor to the reprint of Colonel Bodlien's paper as above, appearing in the Society's Journal.

Referred to the Committee of Papers.

#### TEA-BLIGHT.

Read extract of letter from Mr. J. S. Michael, Cachar, to the address of Messrs. Begg, Dunlop, and Co., accompanying a specimen of a tea-blight insect, as follows:

"These caterpillars attack the Tea plants in clusters of half a dozen and a dozen, and gradually eat all the leaves upon them. When no more remain, they go on to the next bushes, until they clear the whole row.

"Twenty children bring in about half a maund of these insects twice a day; but three days after they have been picked off one part the garden others are to be found there in equally large numbers.

"Some information required regarding these insects, how engendered, and best means of exterminating them."

Agreed to send the specimen to Dr. John Anderson, Officiating Curator of the Asiatic Society, requesting the favor of his endeavouring to identify the species.

#### DICTYOPHORA PHALLOIDEA.

Read letter from Captain R. C. Money, Julpigoree, as follows:

"I shall be much obliged if you would kindly let me know what species of fungus I have given a rough sketch of. I found one here growing out of the ground, about the size of what I represent (5 inches.)

"The upper cup, which though attached, hung loosely on the top of the stalk, is a wrinkled, rich-looking brown and white speckled skin.

"The stalk pure white, with open honey-comb work on it.

"The body, if I can so call it, is a ball of the most perfect white honey-comb pattern lace-work.

"This, when the fungus was picked, stood all out and round the stalk, like a fine white open-worked crinoline! it springs from the top of the stalk under the cap.

"Never having before met a fungus of this description, I shall be obliged if you will let me know what it is.

"The lace-work is most perfect, every hole of the honey-comb being exact and touching the next-hole at equidistant angles. The fungus emits a most powerful and peculiarly scented smell.

This has been identified by Mr. Kurz, Curator of the Botanical Garden, as the "*Dictyophora Phallodea*" a fungus common in Bengal.

#### HEN AND CHICKEN ZINNEA.

A Zinnia, in flower, with small flowerets surrounding it, also a Globe Amaranth, surrounded by smaller flowers, were exhibited by Mr. C. E. Livesey.

Mr. Scott, of the Royal Botanical Garden, writes "the proliferous flower of Zinnia is very interesting. It is in a similar condition to those of the well-known hen and chicken daisy. I have never observed it in Zinnia before, and on reference to Master's Vegetable Teratology, Zinnia is not included in his list of genera presenting such proliferation."

#### ANALYTICAL KEY TO THE CHIEF CONIFERS OF THE PUNJAB HIMALAYA.

Read letter for Baden Powell, Esq., forwarding a copy of Dr. Stewart's paper, as above, with a request on behalf of Dr. Stewart for its publication in the Journal of the Society.

Referred to the Committee of Papers.

#### PROPAGATION OF ROSES, (CHOICE VARIETIES)

Read letter from Captain F. B. Forster, asking information as to the best mode and proper time of the year for striking cuttings of choice Roses.

The Offg. Secretary mentioned that the Society was indebted to Mr. W. Swinhoe for a valuable paper, as follows, on this subject, and which enabled him to reply fully to Capt. Forster's inquiry.

"Nearly all the roses which were issued out by the Agricultural and Horticultural Society during the time that Mr. Sterling was employed on the Society's account by the Royal Botanical Gardens, were raised from cuttings containing two or three buds under glass, but not in leaf mould and sand, but only sand. The mode to be adopted for raising these cuttings, is make first a long narrow bed of white river-sand, fine sand, and not salt or gritty. The sand to be about 8 or nine inches deep. Construct a roofing of thatch to protect from sun which will lift up to let in light, but to guard off sun. Place cuttings in small pots, the smaller the better, close to the rim of the pots, and as close as you please. Bury the pots up to the rims in the sand beds, and place bell glasses over them, the glasses to be kept over cuttings during the day, but to be lifted off at night. In this mode all Mr. Sterling's cuttings were raised, and this succeeded throughout the year excepting in April, May, and June, when the cuttings formed only the callus, but afterwards failed. If bottom heat were secured by placing under the sand Tanning and plunging the pots into Tannings after the callus was formed, you could secure success for every cutting. In the mode above described, Mr. Sterling says, he has known even one single bud buried in the sand to succeed, cut the same as if it were to be budded. The best

time for striking cuttings, is undoubtedly the first two months of cold weather, namely December and January, and for budding and for working the Rose in every way."

The thanks of the Society were accorded for the above presentations and communications.

**EXHIBITION OF PLANTS.**

Mr. G. W. Bartlett exhibited the following newly-imported *Coleus*, *Chrysanthemums*, and ornamental foliaged Plants, viz. :

*Coleus*, the first 5 named varieties imported in 1872, and the 4 last in 1871.

Baroness Rothschild.	Her Majesty.	Ambassador.
Duke of Edinburgh.	Prince of Wales.	Jewell.
Achille.	Hero.	Ajax.

*Chrysanthemums imported in 1871.*

Prometheus.	Golden Christine	Bronze Dragon
Lady Godiva.	Venus.	Gloria Mundi.
St. Justin.	The Diana.	Mrs. Huffington.
Lord Derby.	Cornet.	

*Ornamental Foliaged Plants.*

*Abutilon Thompsoni.* | *Dracena Nigricans.* | *Justicia Augustifolia picta.*

These were referred to the Rajah Suttynanund Ghosal, Bahadoor, and to Mr. C. E. Price as judges, who awarded 50 marks for the collection.

Photographs of the Address presented by the Society to the late President Arthur Grote, Esq., received from England, were laid on the table.

*Thursday, the 19th December, 1872.*

**J. A. CRAWFORD, ESQ., President in the Chair.**

The proceedings of the last meeting were read and confirmed.

The following gentlemen were elected ordinary members :

Nawab Wuzer Ally, A. Campbell, Esq., Lalla Monohur Doss, Arthur Bossanquet, Esq., O. S., Revd. H. J. Harrison, Brigadier General W. J. F. Stafford, Kunwar Ishad Ali Khan, E. Skinner, Esq., Meer Mahomed Ali, and the Hon'ble Arthur Hobhouse.

The names of the following gentlemen were submitted as candidates for election.

J. White Junior, Esq., landholder, Darjeeling,—proposed by the President, seconded by Mr. W. Stalkartt.

Lieutenant-General P. F. Story intimated his desire to rejoin. Agreed to.

The following contributions were announced :

Records of the Geological Survey of India, Vol. V., Part 4, 1872, from the Bengal Secretariat.

Memoirs of the Geological Survey of India, Vol. VIII., Part 2.

Memoirs of the Geological Survey of India, Vol. IV., Part 1.

On the State Forest and Forest Schools of France, by J. Sykes Gamble, Esq., B. A., Oxford, from the Transactions of the Highland and Agricultural Society of Scotland, 1872, from the author.

Proceedings of the Asiatic Society of Bengal, No. IX., November 1872, from the Society.

Report of the Committee of the Bengal Chamber of Commerce, from 1st May to 31st October, 1872, from the Chamber of Commerce.

Three plants of *Mesua ferrea*, two red Tamarind, four red Guavas, two Nagpore Oranges, and seven Lime plants, of four kinds, for the Society's new Garden at Alipore, from Mr. G. W. Bartlett.

#### RECOMMENDATION OF COUNCIL.

Jacobson's hand-book of Tea planting. On the recommendation of the Council, it was resolved to reprint 300 copies of Jacobson's (the Java Tea Planter's) hand-book, as translated by Mr. H. Reinhold and published in the Society's Journal Vol. XIII., Part 3. There having been several enquiries for the pamphlet, Messrs. T. Black and Co.'s tender for the reprint was accepted, to be sold at cost price to members of the Society.

#### EXPERIMENTAL SOWINGS OF VEGETABLE SEEDS.

Read letter from Col. Willoughby Osborn, of Schore, Bhopal, reporting on the result of his experimental sowings of English, American, and French vegetable seeds in comparative Statements as in Appendix.

#### POTATOE CULTIVATION.

Read letters from E. Buck, Esq., C. S., applying for Seed Potatoes for sowing at Nynee Tal, of which the following are extracts :

" I shall be glad of any quantity of potatoes for seed from 10 mds. to 100 mds. I have secured land near Nynee Tal, and am told that the potatoes should be in Nynee Tal by the 15th February.

" I have sown about 50 mds. of Nynee Tal seed potatoes at Cawnpore this season, and I will communicate the result when the crop is ready.

" Could the Society assist me in any way to get out from England potatoes for seed ?

" When at Futtehghurb, the year before last, I had the opportunity of watching the potatoe cultivation which is carried on to a considerable extent round



the native city. Several hundred acres are under potatoes every year. I also made some experiments myself. I found that the cultivators had great difficulty in keeping the potatoe seed through the hot weather and rains, so much so, that in the month of October, when the time for sowing arrived, the price of the potatoes per maund had quadrupled, in consequence of the loss of about  $\frac{1}{4}$  of the stock. Some hill potatoes were then procured from Nynee Tal and sown in the Jail Gardens by Dr. Grant, and we found that the price of the hill seed was not greater than that of the Futtehgurh indigenous seed, while the produce fetched just twice the price. One reason why the produce of hill potatoes is so much more valuable than that of the plains seed, is that all the large potatoes kept in the plains during the hot weather become rotten, only the very smallest can be kept for seed. The result is that the produce is also small.

"The hill potatoes are dug up in September, while potatoes are sown in the plains in October. I am this year sending down 100 maunds, as seed, to Cawnpore, for the municipal farm, by railway, from Moradabad, and they will arrive in ample time for sowing in the plains.

"But the hill potatoes are far from being first-rate, and it is for this reason that I write to you. I shall be in Nynee Tal probably next year, and if I could get a few kinds of English potatoes, in time, to sow in the Hills next year, I would send the produce down to Cawnpore for sowing in the plains in October. Now that the railway will be brought up to Nynee Tal, there is no reason why potatoe seed should not be carried all over the country for sowing in the cold weather, and the cultivation of the potatoe practised near all large towns and villages where manure is sufficiently plentiful, as it is round Futtehgurh, where I find that in the vicinity of the city 702 acres were under potatoe the year before last. In the districts of Cawnpore and Futtehgurh, the cultivation is extending rapidly, I think therefore that it would be quite worth while to take some trouble to introduce a systematic method of supplying cultivation in the plains with good seed, and this may be done, I think, by improving the hill potatoe and supplying the plains, year by year, with fresh seed from the hills.

"Perhaps your correspondent, Mr. Pogson, can tell what kind of potatoes do best in the hills.

"I shall be very glad to report to the Society the result of this year's sowings at Cawnpore, and also the results obtained from any future sowings, with imported seed, if the Society can help me to procure it.

"Would the Society care to have the results obtained at Futtehgurh, last year?"

On the recommendation of the Council it was agreed to order one ton of best seed Potatoes from England, to be sent out by Suez Canal Steamer, for experiments, by Mr. Buck or other members, it being now too late to order out the quantity required by Mr. Buck to reach him in time for February sowings.

EXCHANGE OF PUBLICATIONS.

Read letter from the Netherlands India Society of Industry and Agriculture, Batavia, (Java,) soliciting an exchange of reports and publications, which was acceded to.

PROGRESS OF NEW GARDEN.

The President mentioned that he had received a letter from the Secretary now in England, reporting the engagement of Mr. Hend, as Gardener, on an engagement for 5 years, under very favorable recommendations as to his capabilities for the post.

EXHIBITION OF PLANTS, &c.

Mr. T. M. Francis exhibited a specimen of leaf propagation of "*Episcia pulchella*," with the following remarks.

"The success of another member of the Society in raising plants from a leaf of *Fittonia* induced me to try a similar experiment with a leaf of *Episcia pulchella*. I had it pegged down about a fortnight ago, and now send it to you for inspection. You will see that a young plant is already proceeding from the end of the stem; and I hope in due time to see others spring from the surface of the leaf.

"Those members who take an interest in this mode of propagating plants, will find some curious instances of it recorded in Lindley's *Theory of Horticulture*, chapter 9. I shall be very glad to compare notes with any members who are engaged in experiments similar to those above referred to, and to show them other leaves on which I am experimentalizing."

Mr. J. F. Hamer, exhibited through Mr. A. Rogers, a bunch of grapes grown by Mr. Hamer in Calcutta.

S. H. ROBINSON,  
*Offg. Secretary.*

# REPORT

OF THE

## Agricultural and Horticultural Society

OF

### INDIA.

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*Report from the Council of the Society at the General Meeting of the 23rd January, 1873.*

1. The Council now lay before the Society their customary review of affairs for the year which has expired.

2. Prominent in the history of the period stands the loss which this Society sustained, in February last, by the untimely death of its Patron H. E. The late Earl of Mayo, to whose deep interest in, and practical knowledge of Agricultural science is due the establishment of a department of the State devoted to the promotion of the cause of Agriculture throughout India. At the Monthly General Meeting of the 22nd February, the following resolution was unanimously adopted and recorded :

“That this Society has heard with feelings of the greatest regret of the death of His Excellency the late Viceroy, by the hand of an assassin, at Port Blair, on the 8th instant. Whilst deploing the calamity which has fallen on this country by the sudden removal of an able and enlightened Ruler, this Society desires to place on record its deep sense of the great loss sustained by itself, as well as by all fellow-laborers in the same path, as also to the cause of Agriculture at large in India, by an event which has robbed all of a warm friend and most generous supporter.”

The sorrow with which the Council now recal this sad event, they feel sure is shared in by every Member of the Society.

3. The progress of the Society during the past year has been generally prosperous, the number of paying Members at its close being 684, or 39 more than at the end of 1871; the number of new Members actually elected during the year being 87, which was 28 below the average of the last five years; but on the other hand, the reductions by resignations, only 39, and by deaths, only 6\*, were unusually small, so that the nett result is the accession above noted. It is also satisfactory to add, that the Council have not found it necessary during the year to remove any names from the list for non-payment of subscriptions.

4. In addition to the above-named 684 paying Members, the Society comprizes 35 life Members, 149 absent from India, and 22 Honorary, Associate, and Corresponding Members, bringing up the total on the roll to 890, as specified in the subjoined statement. †

It is very satisfactory also to point to the improved state of the funds of the Society as shewn by the statement of Assets and Liabilities at foot of the annexed Abstract of Receipts and Disbursements. It will be observed that the only liability of the Society is a balance of Rs. 1,950 due to Messrs. D. Handreth and Sons, for American seeds imported in 1872, and per Contra, there was a balance of Cash in hand of Rs. 2,989-14-9, besides Rs. 2,009-15-9 arrears of subscriptions from Members who received seeds and plants during the past five years.

5. The Council have also the satisfaction to report that his Excellency Lord Northbrook consented, soon after his arrival in India, to become Patron of this Society, and expressed a lively interest in its pursuits.

6. The attention of the Council during the past year has been largely directed to the formation of their new Nursery Garden at Alipore, the land for which was secured at the close of 1871.

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\* Dr. W. R. Grylls, Messrs. G. F. Lord, C. H. Barnes, T. E. Carter, F. O. Mayne, and W. G. Wagentrieber.

† For tabular Statement, see next page.

# Report of the Agricultural

CLASSIFICATION	In 40 previous years	1861	1862	1863	1861	1863	1866	1867	1868	1869	1870.	1871	1872	Gross Total	Total real number at the close of 1872 after deducting lapses
Honorary Members	18	0	0	0	0	0	0	0	2	0	0	2	0	22	10
Associate Members	4	0	0	0	0	0	1	0	0	0	1	0	0	6	2
Corresponding Members	5	1	0	0	2	0	0	1	1	1	3	0	0	14	10
Civilians	500	22	13	12	18	30	18	16	17	22	25	24	14	731	205
Merchants and Traders	430	17	19	24	17	22	11	21	13	8	24	14	10	630	135
Indigo and other Tropical Agriculturists	360	15	21	20	20	41	28	24	16	17	34	22	27	645	174
Military Officers	444	26	25	10	21	31	9	19	20	14	20	34	12	685	135
Medical Officers	169	6	7	5	7	14	5	7	6	6	6	8	8	245	54
Aviatics	183	8	3	7	9	8	9	7	8	9	16	16	8	291	78
Clergy	27	0	0	2	0	3	3	1	0	3	0	0	1	40	8
Law Officers	81	2	4	2	3	4	8	4	4	3	6	4	4	129	31
Miscellaneous	50	0	12	9	3	10	6	16	4	11	6	9	3	149	48
	2 263	97	104	91	100	163	108	116	91	94	140	133	87	3,587	890

N B—Of these 860 Men 162 are resident in Calcutta, 579 in the County and 149 in Europe.

The possession of the property was formally made over to the Society on the 13th January last, and was found, on measurement, to comprize an area of about 69 beegahs, and its preliminary management was placed under the orders of a Garden Committee, consisting of the President of the Society and five other Members of the Council. The work accomplished has been the fencing of the whole ground, allotment of different portions for Orchard, Ornamental, and Economic Garden, and the laying down of pukka roads throughout. During the rains the Orchard was planted with 424 of the best kind of fruit trees and a large and various collection of flowering and exotic plants and shrubs were arranged in the ornamental portion, a Rosery and Plant-house have been commenced and a Durwan's lodge built.

7. A plot of rather more than  $1\frac{1}{2}$  beegahs of ground on the east side of the Garden, very conveniently situated for a Gardener's residence, being opportunely offered for sale, the Society purchased this for Rs. 1,500, and contracted for the erection thereon of a suitable house with offices and seed-rooms, at a cost of Rs. 18,000, which is now well advanced, and will be ready, for occupation by April next.

8. An experienced Gardener has been engaged in England under the recommendation of Dr. Hooker, Superintendent of the Royal Botanical Garden, at Kew, and is expected to arrive and take charge this month. The Council have every reason to hope that they may be able in a few months to congratulate the Society on having supplied the want which they have so long felt of a suitable Nursery Garden, and to arrange for the supply therefrom, in course of time, of the best kinds of grafts, cuttings, and acclimated seeds to its Members throughout the country.

9. The system of importing the seeds of the American and French Garden seeds in separate tin packages for each Member has been found successful, and the complaints which were so rife of the non-germination of the seeds imported in 1871 have entirely ceased. The orders for seeds have been given to be similarly packed for 1873, and the wishes of a majority of the Up-Country Members have been consulted in ordering a portion to arrive out

for them earlier in the season; and the quantities of some kinds of seeds have been ordered to be increased.

10. The usual exhibition of vegetables and flowers was not held last year, as in addition to the difficulty of finding a convenient site for the purpose, the Council were desirous of saving their resources for expenditure of the new Garden, on which Rs. 14,440 have been expended during the year, as detailed in the Abstract Account.

Part II., Vol III of the Society's Journal was published in May, and included the two Essays on Tea Cultivation and Manufacture, for which prizes of Rs. 300 and Rs. 200 and two Gold Medals were awarded by the Society. These Essays attracted much attention, and 150 extra copies printed separately, were readily bought up by Members and the public.

The preparation of materials for another number is in hand. The Council would draw the attention of those Members who have time and useful information to convey, and there are no doubt many such throughout the country, to the channel offered by the Society's Journal for communicating, by means of Notes or Essays, to their fellow Members and the public generally, the results of their personal experience in the treatment of Agricultural-Horticultural subjects.

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*Statement of Receipts and Disbursements of the AGRICULTURAL AND  
HORTICULTURAL SOCIETY OF INDIA, from 1st January to 31st  
December, 1872.*

RECEIPTS.

From Members—Subscriptions collected during the year	...	21,581	0	0
„ His Excellency Lord Northbrook, Viceroy, as donation	...	500	0	0
„ Accruings of Interest from Government Securities, &c.	...	1,725	5	4
„ Proceeds of Country Vegetable and other Seeds	...	180	12	0
„ Proceeds of Surplus Stock of American and French Vegetable and Flower Seeds	...	2,653	10	0
„ Proceeds of Fruit grafts	...	1,415	0	0
„ Proceeds of copies of publications of the Society	...	589	4	0
„ Members—Amount for glazed cases, pots, boxes, packing, and forwarding charges for seeds, plants, &c.	...	4,412	10	1
„ Proceeds of Seed Cabinets sold	...	142	0	0
„ Amount of freight re-paid	...	390	4	0
„ Amount of Suspense Account in deposit for appropriation on various accounts	...	497	1	6
„ Sale proceeds of Araucarias	...	360	0	0
			10,640	9 7

Ordinary Annual Receipts ... 34,446 14 11

EXTRAORDINARY RECEIPTS.

From Proceeds of sale of old trees and grass at the ground at Alipore	...	414	10	0
From Proceeds of sale of Government Securities	...	14,023	7	9
From Grant Testimonial Fund Account, amount transferred to this account	...	415	4	0
Extra ordinary Receipts	...	14,853	5	9

TOTAL RECEIPTS, Rupees ... 49,300 4 8

Balance in the Bank of Bengal on the 31st December, 1871 ... 1,267 7 8

GRAND TOTAL, Rupees ... 50,567 11 11



## DISBURSEMENTS.

## PURCHASE OF SEEDS, &amp;c.

By Messrs. Barr & Sugden, balance for the seeds supplied in 1871	2,245	7	0	
„ Messrs. Vilmaurin, Andrieux, & Co. balance for seeds supplied in 1870, and in full for 1872	3,573	4	0.	ti
„ Messrs. D. Landreth & Sons, balance for seeds supplied in 1871, and in part for 1872	6,213	14	5	
„ Messrs. Law, Somner, & Co., balance for seeds supplied in 1871, and in full for 1872	622	11	8	
			12,685	5 1
„ Sundry parties for country vegetable seeds, potatoes, &c.	131	3	6	
„ For cost of fruit grafts, pots, boxes, &c., on account of Members	326	5	3	
„ Sundry parties for Araucarias purchased ...	335	15	7	
			793	8 4
			13,478	13 5

## LIBRARY ACCOUNT.

„ Sundry parties for Books purchased	...	852	1	7
„ Duffry for binding books	...	34	12	0
			886	13 7

## PRINTING ACCOUNT.

„ T. Black & Co., for printing letters of call, money receipts, Cash, and Subscription books			271	4 0
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## JOURNAL ACCOUNT.

„ T. Black & Co., for printing 750 copies of Journal Vol. 3, Part II., New Series, with 150 extra copies of Prize Tea Essays	...	...	1,468	12 4
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## NURSERY ACCOUNT.

„ Establishment from December, 1871, to November, 1872	...	1,053	15	3
„ Purchase of seedlings, pots, boxes, Wardian cases, including Dinghy hire	...	980	7	9
			2,034	7 0

## ESTABLISHMENT ACCOUNT.

„ Office Establishment from December, 1871, to November, 1872	...	...	...	11,605	9 0
Carried over				29,245	11 4

# *and Horticultural Society of India.*

1871.

Brought forward 20,215 11 4

## ADVERTISEMENT ACCOUNT

By Advertising Notices of Meetings and Seeds for distribution, &c 186 9 0

## FREIGHT ACCOUNT

„ Freight paid on boxes of Seeds from Melbourne and America 64 7 4  
And on packages of Seeds plants, &c, sent to members 539 8 0  
623 15 4

## FURNITURE ACCOUNT

„ Sundry parties for purchase of furniture 332 0 0  
MISCELLANEOUS ACCOUNT  
Proportion of House Police and Lighting Rates from October 1871, to September, 1872 and Water rate to December, 1872 634 8 0  
Sundry petty repairs 2 8 0  
637 0 0

## STATIONERY ACCOUNT

„ Sundry parties for Stationery 64 9 6

## DEBENTURE ACCOUNT

„ Sundry parties for balance of Accounts unfunded 95 14 0

„ Prizes to Col Money and J F Watson for their best Essays on Tea 500 0 0  
Duffry for printing 6 copies of Tea Essays for the Judges 13 8 0  
513 8 0

## SEED CABINET

„ Payments on this account 152 0 0

## MEDAL ACCOUNT

„ Messrs Hamilton & Co, for engraving inscriptions on a Silver Medal presented to John Lynham ... 6 0 0

## PETTY CHARGES

„ Postage on letters, Journals, &c, sent and received 238 8 7  
„ Bank of Bengal Commission on Interest drawn and Brokerage for Company Papers sold 56 11 11  
„ Punkhwallahs' pensions, hackery and coolie hire extra packermen, linding and for warding charges, cost of wax cloth, sealing wax, &c 569 11 6  
865 0 0

Total Ordinary Expenses 32,722 3 2

Brought forward ... 32,722 3 2

## CAPITAL ACCOUNT.

By Purchase of landed property and advance for  
building house for Gardener ... 9,856 8 0

## NEW GARDEN ACCOUNT.

„ Cost for building Plant-house,			
Mallies' huts, bridges, &c....	215	10	0
„ Enlarging Tanks ...	690	0	0
„ Purchase of plants, tools, hach-			
kery and cooly hire, labor			
for laying out the garden,			
surveying expenses, and in-			
cluding rent of Depot ...	3,678	4	0
			<u>4,583 14 0</u>

## GRANT TESTIMONIAL FUND.

„ Mint Master, Calcutta, for manu-			
facturing 2 Gold Medals ...	305	4	0
„ Messrs. Hamilton & Co., for en-			
graving inscriptions of pre-			
sentations on Medals, pre-			
sented to Col. Money and			
Mr. Watson ...	20	0	0
			<u>415 4 0</u>

Total, Extraordinary Expenses ... 14,855 10 0

Total Expenditure ... 47,577 13 2

Balance in the Bank of Bengal on  
31st December, 1872 ... 2,989 14 9Ditto in hand of Officiating Secre-  
tary on do. ... 50 0 02,989 14 9GRAND TOTAL, Rupees... 50,567 11 11

*and Horticultural Society of India.*

lix.

DISBURSEMENTS.		RECEIPTS.	
To amount of Ordinary Disbursements during the year 1872 as per Statement ..	32,722 3 2	By amount of Ordinary Receipts during the year 1872 as per Statement ..	34,446 14 11
" " paid for landed property and advance for building house for a gardener .	9,856 8 0	By amount of extraordinary receipts during do. do. ...	14,853 5 3
" " on account of the new garden .	4,593 14 0	" " 49,300 4 8	
" " for 2 Grant Gold Medals .	415 4 0	" Balance in the Bank of Bengal, on 31st December, 1871 .	1,267 7 3
" Balance in the Bank of Bengal, on 31st December, 1872	2,939 14 9	Total, Rupees ...	50,567 11 11
" Balance in hand of Officiating Secretary, on 31st December, 1872 ..	50 0 0		
Total, Rupees	50,567 11 11	Assets.	
		Invested Capital.—In Govt. Securities. lodged in Bank of Bengal, Rs. 29,133 5 3	
		Society's proportion cost of erecting the Metcalfe Hall 23,557 15 9	
		In landed property including building at Alipore .. 9,856 8 0	
		Amount of Cash Balance ... 2,989 14 9	
		Balance of Subscription, &c., due from Members from year 1868 to 1872, as follows, viz.: Balance of Subscription 1,382 4 0	
		" of seeds, grafts, Journals, freights, &c. 627 11 9	
		Total, Rupees ..	67,547 11 6



## Patron:

HIS EXCELLENCY THE RIGHT HON'BLE EARL OF MAYO.

## List of Members.

\* This mark denotes Members who have compounded for their Annual Subscriptions.

† This mark denotes Members who are absent from India, and therefore non-contributors.

‡ This mark denotes Members who, though absent, are desirous of continuing their Subscriptions.

## HONORARY MEMBERS.

The Right Honorable Sir Edward Ryan, A. M., F. A. S., London	...	...	1828	1841
J. Mackay, Esq.	...	...		
Don Ramon de la Sagra, Island of Cuba	..			
Dr. Justus Leibig, Professor of Chemistry in the University of Giessen	...			1843
The Right Honorable Sir Lawrence Peel, London		1842		1856
R. Fortune, Esq.	..			*1856
A. Grote, Esq., London	..	...	1837	1868
The Revd. T. A. C. Firminger, London	...	1851		1868
Baboo Peary Chand Mittra, Calcutta	..			1871
John Scott, Esq., Curator, Royal Botanical Garden, Seebore	...	...		1871

## CORRESPONDING MEMBERS.

D. J. MacGowan, Esq., M. D., Ningpo	...			1851
Mons. Natalis Rondot, Paris	..			1858
Capt. Thos. Hutton, F. G. S., Mussoorie	...			1861
Lieut.-Col. W. H. Lowther, Berhampore	...			1864
James Cowell, Esq., London	...			1864
Dr. H. Cleghorn, Edinburgh	...			1867
Vause, Fretwell, Esq., Supdt. of Model Farms at Bhurganms, Kandeish	..	...		1869
C. Brownlow, Esq., London	...			1870
Lieut. J. F. Pogson, Umballa	...			1870
Dr. George King, Supdt., Royal Botanical Garden, Seebore	...	...		1870

## ASSOCIATE MEMBERS.

Capt. E. P. Nisbet, London	...			1842
Geo. Bartlett, Esq., Calcutta	...			1870

## ORDINARY MEMBERS.

### A.

	<i>Admitted.</i>
Abbott, Horace, Esq., Rajahpore via Koosteah	1858
Abbott, † Lieut.-Col. J. R.	1865
Abdool Gunny, Kajee, Zemindar, Dacca	1860
Adams, G. Esq., Civil Service, Saharunpore	1870
Ady, Charles, Esq., Merchant, Moulmein	1864
Ainslie, Hon'ble W., Civil Service, Calcutta	1847
Aitchison, W. Esq., Manager, Doloo Tea Garden, Cachar	1869
Alexander, † N. Stuart, Esq., C. S.	1864
Alexander, W. Esq., Merchant, Calcutta	1865
Alexander, Lieut.-Col. W. R. E., 1st Bengal Cavalry, Cawnpore	1867
Alexander, Lieut. G., Assistant Commissioner, Rangoon	1870
Allen, Thomas Tayler, Esq., C. S., Bhangulpore	1866
Ameer, Allee Khan, Moonshie, Bahadoor, Calcutta	1869
Anund Rao Puar,* His Highness, the Rajah of Dhar, Dhar, via Indore, Central India	1872
Anderson, Lieut.-Col. W. W., Political Agent, Kattywar	1859
Anley, George, Esq., Civil Engineer, Purneah	1861
Anthony, Adam, Esq., 1st Assistant Accountant-General, Allahabad	1870
Archer, Révd. J. B., Parsonage, Purneah	1869
Armstrong, C. M., Esq., Opium Dept., Bareilly	1858
Armstrong, T. W., Esq., Supdg. Engineer, Takly, Nagpore, Central Provinces	1862
Armstrong, Joseph Samuel, Esq., C. S., Hajeepore Tirhoot	1865
Ashburner, † Lieut.-Col. John, (Bombay Staff Corps) Deputy Commissioner	1864
Atkinson, W. S. Esq., Director, Public Instruction, Calcutta	1864
Austen, † Capt. Godwin, Survey Dept.	1867

### B.

BADGER, † A. Esq., Manager, Equitable Coal Company's Colliery	1867
Bainbridge, † A. R. Esq., Civil Service	1868
Baird, Lieut.-Col. A. F., Executive Engineer, Cawnpore	1861
Baillie, Dr. N. B., Civil Surgeon, Bhangulpore	1872
Banister, † Dr. G.; F. R. C. S., Governor General's Body Guard	1868
Barlow, G. N. Esq., Civil Service, Bhangulpore	1864
Barstow, H. C., Esq., Civil Service, Allahabad	1868

# B.—(Continued.)

	Admitted.
Bartlett, Col. H. T., Bengal Staff Corps, Saugor	1865
Barker, Dr. R. A., Civil Surgeon, Beerbhoom	1870
Barron, Capt. W., Dy. Supdt., Revenue Survey, N. W. Frontier, Muzree, Punjab	1871
Bayley, B. C., Esq., Civil Service, Calcutta	1863
Bayley, Stuart Colvin, Esq., Civil Service, Calcutta	1859
Beadon,† Henry, Esq., Civil Service	1867
Beames, John, Esq., Civil Service, Balasore	1871
Beaufort, Francis L., Esq., Civil Service, Calcutta	1838
Beaumont, Dr. Thomas, Residency Surgeon, Indore	1870
Becher, William, Esq., Gowhatti	1855
Becher, J. M. Esq., Indigo Planter, Palee Factory, Omdao Oudh	1862
Becher, Colonel S., Commanding Troops, Delhi	1870
Beckett, W. O. A., Esq., Dy. Commr., Cooch Behar	1871
Beeby, G. O. Esq., Solicitor, Calcutta	1866
Beer Chunder Manick Bahadoor, Maharajah of Tipperah	1870
Bejoy Kesh Roy, Bahadoor, Rajah of Andool	1870
Bennett, T. B., Esq., Lallpore Factory, Purneah	1871
Benson,† Colonel J. C.	1863
Benson, George, Esq., Pleader, High Court, N. W. P., Bareilly	1868
Bentall,*† Edward, Esq., Civil Service	1837
Benayk Rao Gunput Kibia Sahaib, Indore	1872
Berkeley,† L. Esq., Commissioner Paper Currency	1855
Berkeley, Vilters, Esq., Judge, Small Cause Court, Nynce Tal	1869
Bertelson, H. H. F. Esq., Tea Planter, Mohurgong, Darjeeling	1868
Beveridge, H. Esq., C. S., Backergunge	1865
Bhopal,* H. H. the Begum of	1870
Bhowany Sing,* Maharajah, Duttea	1864
Bhugwan Sing, Sirdar, Umritsur	1871
Bhugeruttee Mohendra, Bahadoor, Maharajah of Killoh, Dewkonull	1871
Bickham,† Geo. Esq., Merchant	1869
Bignell, R. A. D'O. Esq., Assistant Superintendent of Police, Chittagong Hill Tracts	1867
Bimala Churn Bhuttacharjea, Deputy Collector and Magistrate, Nowada via Behar	1870
Bird, Col., J. W. L., Morar	1871
Birch, Capt. R. G., Cawnpore	1867
Birch, Lieut. H. H., 27th P. N. I., Bareilly	1869
Bishop,*† Major H. P., (Artillery)	1853
Blacker, G. M. Esq., Merchant, Calcutta	1856



## B.—(Continued.)

	<i>Admitted.</i>
Blanchett, J., Esq., Register General's Dept., Allahabad	1871
Blathwayt, Capt. L., Asst. Commr., Golaghat, Seebaugor	1871
Blechynden, R. Esq., Merchant, Calcutta	1858
Blechynden,† A. H. Esq., Secretary, Agri.-Hort. Society of India	1851
Boddam, Col., Hungerford, Dy. Commr., Hazareebaugh...	1871
Bosanquet, Arthur, Esq., C. S., Judge of Ahmednuggur, Bombay	1872
Bouchier, Brigadier-General G. C. B., Royal Artillery, Shillong	1868
Bourne, Walter, Esq., Resident Engineer, E. I. Railway, Assensole	1855
Boulderson, A., Esq., C. S., Bijnore	1872
Bowers, Mrs., Bhuptnai, Protoubgunge, Bhaugulpore	1872
Brae, T. Esq., Dabracole, Commercolly, E. B. Railway...	1854
Brandis,† Dr. D., Supdt. of Forests	1857
Brander, James, Esq., E. B. Railway, Sealdah	1865
Bridgman, J. H. Esq., Goruckpore	1868
Brock, Charles Esq., Merchant, Calcutta	1867
Brodhurst, M. Esq., Civil Service, Benares...	1859
Brodie,*† Major T.	1836
Browning, C. G. Esq., Director, Public Instruction, Oude	1872
Broucke, W. J. Esq., Indigo Planter, Bhugha Factory, via Chumparun	1859
Broughton, E. Esq., Merchant, Calcutta	1865
Brown,† Dr. Robert, Political Agent	1868
Brown, Walter, R. Esq., Merchant, Calcutta	1869
Browne, Lord Ulick, Civil Service, Calcutta...	1867
Browne,† Revd. J. Cave	1866
Brown, Forbes, Scott, Esq., Merchant, Penang	1840
Brown, Col. D., 1st Madras Fusiliers, Tenasserim Division	1856
Brown, J. A. Esq., Superintendent of Roads, Cachar	1870
Browning,† Fred. R. Esq., Civil Engineer, E. I. R. Chord Line	1867*
Brooke, R. P. Esq., Bubnowly, Goruckpore	1871
Buck, E. C. Esq., C. S., Nainee Tal	1870
Buckingham, J. Esq., Tea Planter, Amgoorie via Morar Bazar, Seebaugor Assam	1867
Buller,*† Frederic Pole, Esq., Civil Service	1837
Bury, Percival, Esq., Tea Planter, Deedurkoosh, Cachar...	1869
Ruskin, E. G. Esq., Calcutta	1864
Buakin, M. Esq., Serepore Factory, Chuprah	1870
Butt, Geo. Esq., Civil Service, Shajehanpore	1866
Byrne William A., Esq., Opium Department, Ghazespore	1870

CADELL, Alan., Esq., Civil Service, Mozuffernuggur, N W. P. ...	1872
Calder, G. L. Esq., E. B. Railway, Kanchraparah ...	1871
Cameron,† Dr. J. McLeod, Civil Surgeon ...	1865
Cameron, J. T. D. Esq., Calcutta ...	1869
Campbell, W. F. Esq., Comillah ...	1838
Campbell,*† Archibald, Esq., M. D. ...	1838
Campbell, Hon'ble Geo., Lieut.-Govr. of Bengal, Calcutta ...	1865
Campbell, Major A. C. Dy. Commr., Seebangor, Assam ...	1871
Campbell, N. J., Esq., Kurnoul Factory, Tirhoot ...	1871
Campbell, D. W. Esq., Locomotive Supdt., E. I. Railway, Jamalpure ...	1870
Campbell, A. Esq., Tea Planter, Selim Tea Estate, Kur- seong ...	1872
Campbell, W. Esq., Landholder, Sonakhan Belaspore, C. P. ...	1872
Carew,* R. R. Esq., Shajehanpore ...	1846
Cargill, T.*U. Esq., Cossipore ...	1871
Carleton, C. F. Esq., Indigo Planter, Meerpore, Motee- harry, Chumparun ...	1868
Carnac, C. F. Esq., Civil Service Ghazeepore ...	1865
Carnac,† H. Rivett, Esq., Cotton Commissioner ...	1869
Carrick, Henry, Esq., Locomotive Supdt., E. I. Railway, Jamalpure ...	1863
Carter, J. H. Esq., Civil Service, Futtehpore ...	1870
Carnegy, P. T. Esq., Asst Commr., Jorehaut, Assam ...	1872
Castle, C. T., Supdt. of Police, Jaunpore ...	1865
Chambers, Charles, Esq., Civil Engineer, E. I. Railway, Jamalpure ...	1868
Chardon, W. B. Esq., Seepah Factory, via Arrah ...	1864
Chauntrell, F. D. Esq., Solicitor, Calcutta ...	1870
Cheetham,† W. H. Esq., Merchant ...	1870
Channell, Thos. Esq., Dewan Tea Estate Debrooghur, Upper Assam ...	1870
Chester,† Capt. H. D. E. W. Offg. S. A. C. G. ...	1869
Cheyne, Charles, Esq., Supdg. Engr., Holkar State Rail- way, Mhow, Central India ...	1872
Chrestien,† T. Esq. ...	1864
Christian, A. Esq., Indigo Planter, Oomgong Factory, Mudhoobanee, Tirhoot ...	1869
Christian, A. Esq., Putterghat Fy., Mudheepoorah, Bha- gulpore ...	1872
Chunder Kaunt Mookerjee, Baboo Calcutta ...	1866

## C.—(Continued.)

Admitted.

Clarke, H. P. Esq., Cinnatoliah, North Luckimpore, via Jorehaut Assam	1870
Clay, A. L. Esq., Dept. Commr., Chittagong	1868
Clark, Major E. G., Settlement Officer, Kheree	1872
Cockburn,† J. F. Esq.	1866
Cogswell,† W. H. Esq.	1866
Cole, Revd. J. Supdt., Lawrence Asylum, Sanawur	1865
Collis,† S. E. Esq., Solicitor	1859
Collis, F. S., Esq., Barrister-at-Law, Calcutta	1871
Colville,*† Sir J. W.	1849
Colvin, B. D. Esq., Merchant, Calcutta	1868
Comley, J. M. Esq., Calcutta	1871
Commandant of the Deolee Irregular Force, Deolee via Jeypore	1871
Commandant of the Erinpoorah Irregular Force, Erinpoorah	1871
Comber, B. E. C. Esq., Tea Planter, Debrooghur	1870
Conroy, G. H. W., Esq., Chief Store-keeper, E. I. Railway, Calcutta	1871
Conti,† Geo. Esq.	1870
Connell, T. Esq., Sildooobie Garden, Cachar	1870
Cooke, F. C. Esq., Talcab Factory, via Burhuj, Goruckpore	1866
Cope,† Henry, Esq., Merchant	1847
Corbyn, the Revd. H. Abbottabad, Hazara, Punjab	1865
Corbyn, Capt., E. C., Dy. Commr, Shahpore, Punjab	1871
Corbett, Major A. F., District Superintendent of Police, Budaon	1871
Cornell, W. Esq., Civil Service, Mymensing	1861
Cosserat, Lewis Esq., Indigo Planter, Buihogah via Chupra	1859
Courjon, Alfred, Esq., Zemindar, Chandernagore	1863
Courjon, Achille, Esq., Chandernagore	1869
Cowley, F. W. R. Esq., Civil Service, Comillah	1867
Coxhead,† T. E. Esq., Joint Magistrate	1868
Craddock,† Dr. W., 1st Goorkah Regt.	1868
Craigie, H. W. Esq., Luckipore Tea Estate, Cachar	1872
Craster, E. C. Esq., Civil Service, Soory, Beerbhoom	1858
Crawford, J. A. Esq., Civil Service, Calcutta, (President)	1857
Craven, James, Esq., Monghyr	1871
Crommelin,† C. R. Esq.	1860
Crommelin, Lieut-Col. J. A., Darjeeling	1857
Crosthwaite, R. J. Esq., B. A., C. S., Peeleebheet, Zillah Bareilly, N. W. P.	1869

C.—(Continued.)

	Admitted.
Cumberlege,† Major-General E. A.	1866
Cumming, W. Esq., Indigo Planter, Rajmehal	1851
Cummins, J. G. Esq., Telegraph Master, Cachar	1870
Currie,† Capt H. O., 19th Hussars	1865
Currie,† G. M. Esq., Civil Service	1868
Curtis,† J. F. Esq., Indigo Planter	1860

D.

Da Costa, Joseph, Esq., Pleader, Civil Court, Bhangulpore	1865
Dalton, Lieut.-Colonel E. T., Commissioner of Chota Nagpore	1848
Daly, F. D. Esq., Manager, Simla Bank, Umballa	1867
Daly,† R. M. Esq., H. M., Bengal Marine	1869
Dando,† Capt. A. Cunningham	1872
Daswood, H. W. Esq., Civil Service, Agra	1860
Daunt, W. Esq., Mozufferpore Tirhoot	1857
Davies, Lieut.-Col. J. S., Judicial Commissioner, Chota Nagpore	1857
Davison, Lt. T., 15th King's Hussars, Indore, C. I.	1872
Dalbusset, H. Esq., Calcutta	1871
Dalton,† G. B. T., Esq., Civil Service	1870
Davies, Lieut.-Col. F. J., Barrackpore	1869
Davis, W. P. Esq., Bengal Police, Midnapore	1870
Davidson, James, Esq., Delrooghur Assam	1870
Dear, Herschel, Esq., Monghyr	1860
Debendra Nath Mullick, Baboo, Calcutta	1870
D'Eye, Capt. W. Rust, Landholder, Sonakhan, Belaspore, C. P.	1872
DeHoxar, C. F. F., Esq., Indigo Planter, Allahabad	1871
Delane,† Major G.	1864
Delauney J. P. Esq., Indigo Planter, Commillah	1862
Deputy Commissioner of Sumbulpore	1866
Deputy Commissioner of Oomraottee	1869
Deputy Commissioner of Ellichpore	1869
Deputy Commissioner of Woon	1869
Deputy Commissioner, Booldan District	1871
Deputy Commissioner of Bassim, West Berar	1871
Deputy Bheel Agent, Maunpore, Mhow, Indore	1872
Deveria, J. Esq., Zemindary Manager, Bengal Coal Company, Raneegunge	1866
Deverell, H. Esq., Indigo Planter, Ackrigunge Factory, via Berhampore	1854
Deverell, F. R. Esq., Merchant, Calcutta	1871

**D.—(Continued.)**

	<i>Admitted.</i>
Dias, T. C. Esq., Advocate, Moulmein ...	1866
Dickens, Lieut.-Col. C. H., Artillery, Calcutta ...	1856
Dicken, G. Esq., Secy. and Treasurer, Bank of Bengal, Calcutta ...	1863
D'Oyly, W. H. Esq., Civil Service ...	1872
Dodgson, W. Esq., Kallygunge Factory, Rungpore ...	1864
Dombal, Rchd. De, Esq., Neechindpore, Kishnaghur ...	1872
Duff, W. P. Esq., Merchant, Calcutta ...	1867
Duffin, Col. R. H. M., Bengal Army, Umballa ...	1868
Drummond, E. Esq., Civil Service, Patna ...	1866
Dunne, M. P., Esq., Zemindar, Sumshabad, Azimgurh ...	1872
Drury, Col. C. C., Police, Department, Nynee Tal ...	1860

**E.**

EARLE, Dr. F. J., Civil Surgeon, Kishnaghur ...	1859
Eddy, H. C. Esq., Dacca ...	1865
Eiden, Hon'ble A., Civil Service, Rangoon ...	1870
Edgar, J. W. Esq., Civil Service, Cachar ...	1869
Edwards, Anthony, Esq., Meerpore Factory, Mottee-harree, Chumparun ...	1866
Edgar, E. L. Esq., Tea Planter, Cossipore Factory, Cachar ...	1871
Egerton, R. E. Esq., C. S., Simla ...	1864
Eisenlohr, † F. Esq., Merchant ...	1870
Eldridge, † F. G. Esq., Merchant ...	1867
Erskine, H. C. Esq., Indigo Planter, Elambazar, via Bhulpore ...	1855

**F.**

FAIRLEY, W. C. Esq., Merchant, Rangoon ...	1866
Falcon, A. B. Esq., Civil Service, Maldah ...	1858
Farquhar, † Capt. J. H. T., Stud Dept. ...	1869
Fergusson, Hugh, D. Esq., Indigo Planter, Allyghur ...	1867
Ferris, Dr. G. R., Calcutta ...	1865
Fisher, † Lieut.-Col. G. B., District Supdt. of Police ...	1865
Fisher, J. H., Esq., Civil Service, Wardha, Central Provinces ...	1871
Forbes, Major, H. T. Kishnaghur ...	1856
Forbes, A. Esq., Civil Service, Tajpore, Tirhoot ...	1869
Forbes, Lieut. James, Dum-Dum ...	1869
Forbes, J. C. M. Esq., C. E., Assistant Engineer, Kur-ruchpore, via Monghyr ...	1870
Forbes, L. R. Esq., Extra Assistant Commissioner, Chota Nagpore ...	1871

## F.—(Continued.)

Admitted.

Forlong, Lieut.-Col. J. G. R., Offg. Chief Engr. of Oude, Lucknow ... ..	1870
Francis, T. M., Esq., Solicitor, Calcutta ... ..	1871
Franklin, Capt. W., H. M.'s 76th Foot, Secunderabad, Hyderabad, Deccan ... ..	1870
Fraser, W. F. Esq., Bank of Bengal, Bankipore ... ..	1867
Fraser, Major the Hon'ble W. M., Meerut ... ..	1870
Freck, Deitch, F. Dlen, Esq., Merchant, Calcutta ... ..	1872
Freeman, H. Esq., Lall Serriah Factory, Seegowly, Chumparun ... ..	1866
Fox, Mrs. Annie, Singhesur, Bhangulpore ... ..	1871
Fukeerooddeen, Prince Mahomed, No. 18, Boituckhana, Calcutta ... ..	1868
Fytche,† Col. A. ... ..	1849
Fyz Alee Khan, Nawab, Bahadoor, Jeypore ... ..	1871

## G.

GALIFFE, J. F. Esq., Collector of Canal Tolls, Calcutta ... ..	1856
Gamble, J. Sykes, Esq., Asst. Conservator of Forests, Darjeeling ... ..	1872
Garbett, Lieut. C. H. Asst. Commr., Maunbhoom ... ..	1868
Gardner, D. M. Esq., Civil Service, Jaunpore ... ..	1872
Gasper, N. M. Esq., Pleader, Small Cause Court, Calcutta ... ..	1871
Gibbon, T. M. Esq., Indigo Planter, Betteah Factory, Tirhoot ... ..	1860
Gibbon, W. F. Esq., Scur., Doolha Factory, Goruckpore ... ..	1870
Gilbert, Edwin, Esq., Ex.-Engineer, C. I. Administration, Morar ... ..	1871
Gillam, F. A. Esq., Agent Bank of Bengal, Mirzapore ... ..	1870
Girdlestone, C. E. R. Esq., Civil Service, Katmandoo, Nepaul ... ..	1872
Glascott, G. A. Esq., Locknathpore, Joyrampore, E. B. Railway ... ..	1871
Glass,† J. Esq., Ex.-Engineer, D. P. W. ... ..	1866
Goluck Chunder Bose, Baboo, zemindar, Cuttack ... ..	1871
Goonendra Nath Tagore, zemindar, Calcutta ... ..	1872
Gopeenath Roy, Baboo, Calcutta ... ..	1871
Gordon, Col. John, Commanding at Jheslum ... ..	1871
Gordon, John Esq., Bank of Bengal, Calcutta ... ..	1865
Gouldhawke, J. Esq., Lallpore Concern, Purneah ... ..	1851
Gowan, Lieut.-Col. J. Y., Bengal Staff Corps, 2nd in Command, 33rd Regt. N. I., Allahabad ... ..	1865
Grace, Geo. Esq., Sylcooree, Cachar ... ..	1865
Graf, C. Esq., Merchant, Calcutta ... ..	1869

G.—(Continued.)

	Admitted.
Graham, † Joseph Esq., Barrister-at-Law ...	1858
Graham, W. F. Esq., Indigo Planter, Colgong ...	1862
Graham, W. Forbes, Esq., Ourungabad via Pakour ...	1867
Graham, † A. Esq., Merchant ...	1868
Graham, Wm. Francis Esq., M. C. S., Chicacolo ...	1871
Grant, Thomas Esq., Indigo Planter, Bhagulpore ...	1848
Grant, G. H. Esq., Indigo Planter, Bhagulpore ...	1859
Grant, John Peter, Esq., Junr., Civil Service, Moorshe- dabad ...	1860
Grant, † T. R. Esq., Merchant ...	1863
Grant, C. Esq., Lebong, Darjeeling ...	1864
Gray, J. J. Esq., Indigo Planter, Dacca ...	1846
Gray, Henry A. Esq., Solicitor, Calcutta ...	1869
Gray, Dr. Edward, Medical Officer, Jorehaut Tea Compa- ny, Cinnemara, Assam ...	1868
Grey, Lieut. L. J. H., Asst. Commr., Ranchie ...	1871
Greenwood, W. J. Esq., Asst. Commr., Lallutpore ...	1871
Greenhill, † T. Esq., V. S. ...	1865
Grees Chunder Sing, Oomar, Zemindar, Pikeparah, near Calcutta ...	1867
Grey, † The Hon'ble W. ...	1867
Grey, E. Esq., Berhampore ...	1868
Griffith, Ralph Esq., Principal, Queen's College, Benares ...	1870
Grote, A. G. Esq., Baraitch, Oudo ...	1866
Growse, F. S. Esq., Muttra ...	1870
Guavain, Capt. V., Commander of the Steamer <i>Meinam</i> , Calcutta ...	1871
Guise, J. J. Esq., Merchant, Calcutta ...	1867
Gungapershad, Baboo, Deputy Collector, Moradabad ...	1871

H.

HALFORD, Chs. Esq., Bill Broker, Calcutta ...	1872
Halkett, D. C. Esq., Civil Service, Humeerpore, North- West Provinces ...	1870
Halsey, F. Esq., Manager, Branch Bank of Bengal, Um- ritsur ...	1863
Hall, R. W. Esq., Balladhun Garden, Cachar ...	1870
Hamilton, J. C. Esq., Indigo Planter, Nurhar Factory, Mudobarry, Tirhoot ...	1867
Hamilton, † T. F. Esq., Merchant, Calcutta ...	1870
Hankin, Lt.-Col., G. C., Segowlie ...	1864
Harlow, Wm. Esq., Manager, Eastern Cachar Tea Com- pany, Cachar ...	1871

## H.—(Continued.)

	<i>Admitted.</i>
Harris, G. L. Esq., C. S., Gya ...	1863
Harrison, H. A. Esq., Civil Service, Futtchghur ...	1863
Harrison, Revd H. J., Tollygunge ...	1872
Harrold, H. M. Esq., Tea Planter, Kalabaree, Dar- jeeling ...	1868
Hart, Robert Esq., Planter, Heroncherra Garden, Cachar	1872
Haughton, Col. J. C., Commr., Cooch Behar, Julpigoree	1859
Hawkins, * † John Abraham Francis, Esq. ...	1837
Hawkins, Capt. E. L., R. A., Morar ...	1871
Haworth, J. H. Esq., Broker, Calcutta ...	1870
Hay, P. J. Esq., Manager, Sildoobie Tea Garden, Cachar	1870
Hayes, † Dr. W. H. ...	1861
Health Officer, Calcutta ...	1865
Heely, W. L. Esq., C. S., General Hospital, Calcutta ...	1864
Henderson, † Dr. G., Civil Surgeon ...	1863
Henderson, † M. Esq., Merchant, Calcutta ...	1864
Hemall Seal, * Baboo, Calcutta ...	1858
Herbert, † Col. C. ...	1864
Herklots, D. G. Esq., Agriculturist, Calcutta ..	1870
Herschell, † Sir W. J., Bart., Civil Service, Dy. Commr.	1870
Hewitt, † J. F. K. Esq., Civil Service ..	1860
Hill, Dr. J. H. G., Turcooleah Factory, Motecharee Chum- parun ...	1865
Hill, R. H. Esq., Scraba, Tirhoot ...	1865
Hills, * † James, Esq., Senior, Indigo Planter ...	1837
Hinde, † W. H. Esq., Merchant ...	1869
Hindhangh, T. S. Esq., Chowkeedangah, Ranoeungoo ...	1870
Hinduarsh, Thomas Esq., Eastern Bengal Railway, Kan- charaparah ...	1866
Hittoll Messer, Baboo, Zemindar, Mauncoor .	1864
Holart, R. T. Esq., Etah ...	1870
Hobklay, Alfred Esq., Merchant, Moulmein ...	1866
Hobhouse, Hon'ble Arthur., Legal Member of the Su- preme Council, Calcutta ..	1872
Hogg, Capt. T. W. Assistant Commissioner, Harda ...	1868
Hollway, F. H. Esq., Indigo Planter, Monghyr ...	1863
Holloway † Capt. E. V., 5th Irregular N. I. ...	1870
Holroyd, Col. Charles, Debrooghur, Assam ...	1866
Homfray, J. N. Esq., Bengal Marine Service, Port Blair	1863
Hoskins, Dr. E. J., Civil Surgeon, Raucheo ...	1870
Hotson, A. Esq., Merchant, Rangoon ...	1872
Howard, Bernard, Esq., Merchant, Mirzapore ...	1868
Howard, Dr. J. S., Civil Surgeon, Oomraotee ...	1870
Howe, W. A. Esq., Bulleah, Ghazeepore ...	1870



II.—(Continued.)

	Admitted.
Hudson, † Cunningham, Esq., Merchant ...	1867
Hudson, C. E. Esq., Bugli Pinjra, Azimghur ...	1870
Hunter, Lieut. R., Asst. to Supdt. of Tributary Mehals, ‘Keonghur ...	1871
Hurrendhur Kishore Singh, Baboo, Betteah, Tirhoot ...	1870
Hurst, J. Esq., Mussoorie ...	1870
Hutchinson, Col. A. R. Esq., Political Agent, Morar, Gwalior ...	1862
Hutchison, J. H. Esq., Merchant, Calcutta ..	1870
Huthwaite, Lieut. Genl. Sir E., K. C. B., Nynsee Tal ...	1872
Hyslop, Archibald, Esq., Merchant, Bimlipatam ...	1867

I.

INGELS, Lionel, Esq., Manager Namdung Estate, Seeb- sagar, Upper Assam ...	1872
Inskip, C. T. Esq., Calcutta ...	1870
Ireland, Wm. De'Coursey, Esq., Dy. Commr., Akyab ...	1871
Irshad Ali Khan Kunwar, landowner, Sadabad, Muttra ...	1872
Irving, † Dr. James, Civil Surgeon ...	1867
Irwin, Lieut.-Col. W., Stnd Dept, Saharunpore ...	1864
Isack, Thos. S. Esq., Supdg. Engineer, Calcutta ..	1869
Ishore Pershaud Narain Sing, Bahadoor, Rajah of Benares	1854

J.

JACK, E. A. Esq., Merchant, Calcutta ...	1863
Jackson, † Hon'ble Elphinstone, Civil Service ...	1860
Jackson, Hon'ble L. S., Civil Service, Calcutta ...	1852
Jackson, Dr. C. J., Civil Surgeon, Berhampore ..	1861
James, A. H. Esq., Assistant Commissioner, Naga Hills, Assam ...	1868
Jameson, W. Esq., M. D., Saharunpore ...	1852
Jarrett, Capt. H. S., Staff Corps, Calcutta ...	1871
Jeunings, C. B. Esq., Sylhet ...	1862
Jennings, Saml. Esq., Calcutta ...	1863
Jerdon, O. M. Esq., Sub-Deputy Opium Agent, Gya ...	1872
Jogendronanth Mullick, Zemindar, Andool ...	1866
Johnstone, Capt. J., Special Asst. to Supdt. of Tributary Mehals, Keonghur ...	1871
Jones, Frederick, Esq., Civil Service, Serampore ...	1870
Jones, H. Lloyd, Esq., Bengal Police, Dinagepore ...	1871
Jones, W. H. Esq., Calcutta ...	1863
Joy Singh,* Deo Bahadoor, Maharajah of Chikari ...	1868

J.—(Continued.)

	Admitted.
Joykissen Mookerjee, Baboo, Zemindar, Ooterparah ...	1852
Judge, W. J. Esq., Solicitor, Calcutta ...	1858
Jung,* Bahadoo, Maharajah, G. C. B., Nepal ...	1860

K.

KALEE Kissen Tagore, Baboo, Calcutta ...	1869
Kally Prosono Roy, Baboo, Zemindar, Noral, via Jessore.	1867
Kemp, Geo Lucas, Esq., F. R. G. S., Secretary of the Standard Life Assurance Society, Calcutta ...	1871
Kemble, W. Esq., Civil Service, Purneah ...	1872
Kennedy,† J. Pitt, Esq., Barrister-at-law ...	1867
Khettermohun Sing, Baboo, Dinagopore ...	1870
Kidd, Dr. H. A., Civil Surgeon, Mundla ...	1871
Kincaid, Lieut.-Col. W., Bheel Agent, Sirdaspore via Indore ...	1867
King,† R. W. Esq., Bengal Police ...	1861
King,† Dr. Geo., Supdt, Royal Botanical Garden ...	1872
Knowles,† H. Esq., Merchant ...	1852
Knyvett, Capt. W. L. N., District Supdt. of Police, Ber- hampore ...	1864
Krauss, Henry Esq., Rangoon ...	1865
Kristinder Roy, Rajah, Bulihar, Rajshahye...	1866

L.

LAMB, E. Esq., Buchour Factory, Durbangah, Tirhoot ...	1870
Lamoureux, F. Esq., Merchant, Calcutta ..	1863
Lance, C. E. Esq., Civil Service, Midnapore .	1858
Landale, Geo. A. Esq., Indigo Planter, Turtipore, Maldah	1868
Landale,† Alex. Esq., Merchant ...	1869
Lane,† T. B. Esq., Civil Service ..	1855
Langlois, J. P. Esq., Tea Planter, Chittagong ...	1866
Larminie, W. R. Esq., Civil Service, Bancoorah ...	1862
Lawford, H. B. Esq., C S., Jessore ...	1865
Lawrie, T. H. Esq., Sildoohee Factory, Cachar ...	1872
Leeds, Henry Esq., Conservator of Forests, Bengal, Calcutta ...	1868
Lees, Major, W. M., Under-Secretary, Government of India, Military Department ...	1871
Leibert, M. Esq., Tea Planter, Hazareebaugh ...	1868
Leitch, Henry, Joseph, Esq., Broker, Calcutta ...	1872
Lethbridge, T. C., Esq., Moorlah Factory, Chumparun ...	1871
Levinge, H. C. Esq., C. E., Arrah ...	1863

## L—(Continued.)

	Admitted.
Lewis, Hon'ble W. T., Resident Councillor, Penang	1840
Livesay, C. E. Esq., Asst.-Engineer, Irrigation Dept., Baroon via Dehree	1868
Llewellyn, W. Esq., Durbungah..	1871
Lloyd, M. Esq., Indigo Planter, Shapore Oondée, Tifhoot	1863
Lloyd, W. Esq., Darjeeling	1869
Locke, H. H. Esq., Principal, Government School of Arts, Calcutta	1866
Lockhart, Capt. W. S. A., Dy. Assistant Quarter Master General, Peshawur	1871
Lovell, Thos., Esq., Deputy Chief Engineer, Lucknow	1869
Lovell, Capt. H. P., Supdt, P. and O. Company, Cal- cutta	1870
Lewis, † E. E. Esq., Civil Service	1864
Lewis, J. M. Esq., Civil Service, Dacca	1865
Lowther, *† Robert, Esq., Civil Service	1836
Luchmeput Sing, Roy Bahadoor, Banker, Calcutta	1864
Luchmessur Sing, Bahadoor, Zemindar, Mozufferpore, Tifhoot	1861
Lukin, Major F., 3rd Hussars, Ahmednuggur, Bombay	1860
Lushmarrin, Lalla, Zemindar, Bareilly	1870
Lushington, † H. Esq., C. S.	1865
Lyall, R. D. Esq., Civil Service, Dacca	1869
Lynam, † John Esq., Supdt, Reserve Police Force, Calcutta	1866
Lynch, Dr. Sydney, Supdt of Jail, Ahipore	1872

## M.

MACALISTER, R. Esq., Merchant, Calcutta	1872
MacDonald, C. Esq., Dowlutpore Factory, via Roosa, Tifhoot	1867
MacDonald, M. N. Esq., Portipore Factory, Suran	1869
MacDougall, Major W. C., Deputy Inspector of Studs, Saharanpore	1867
MacDonald, Aneas, J. Esq., Lohurreah Factory, Chum- paran	1872
Mackillean, J. Esq., Merchant, Calcutta	1865
MacLachlan, J. E. Esq., Calcutta	1861
Maclean, A. T. Esq., Civil Service, Burdwan	1858
Macmillan, J. Esq., C. E., Cuttack	1865
Macnaghten, Chester Esq., Principal, Rajkumar College, Rajkote, Katlywur	1869
Maoneill, Lieut Duncan, 41st M. N. I., Cuttack	1869
Macpherson, Hon'ble A. G., Judge of the High Court, Calcutta	1867

M.—(Continued.)

	Admitted.
Macpherson, W. Esq., Civil Service, Cuttack	... 1861
Macpherson, *† George G. Esq.	... 1886
Macdonald, Major John, Survey Department, Calcutta	.. 1871
Macdonell, Brigadier Genl. A., C. B., Allahabad	... 1871
Mackenzie, Dr. S. C., Superintendent, Presidency Jail, Calcutta	... 1871
McIntosh, R. Esq., Merchant, Calcutta	... 1872
Mackeson, Lieut.-Col. F. L., 2nd in Command, Meywar Bheel Corps, Kherwarrah, Rajpootana	... 1860
McCulloch, Col. W., Cherra Poonjee	... 1872
Madho, Rao, Rajah, Bareilly	... 1871
Maharaj * Dheraj Matabchunder Bahadoor, Rajah of Burdwan	... 1836
Maharajah * of Johoro	... 1868
Maharajah of Bettiah, Tirhoot	... 1870
Maharajah of Cooch Behar	.. 1864
Maharajah of Cashmere	.. 1872
Mahomed Alli Khan, Moonshee, Government Pleader, Dinapore	... 1866
Mahony, H. C. Esq., Dhurrunkhole Factory, Silchr., Cachar	... 1869
Mainwaring, Col R R, 6th European Regt., Cawnpore	... 1861
Maitland, Capt. W. G., Asst. Commissioner, Sibsaurgor, Assam	... 1871
Manager, Government Garden, Fyzabad, Oude	.. 1871
Manager, Tarrapore Tea Garden, Cachar	.. 1871
Manager, Chundypore Tea Company, Cachar	.. 1862
Manager, Kanchunpore Tea Company, Cachar	... 1862
Manager, Victoria Tea Company, Cachar	.. 1862
Manager, Bengal Tea Company, Cachar	.. 1864
Manager, East India Tea Company, Assam	.. 1865
Manager, Dahingenpore Factory, Assam	.. 1865
Manager, Bowaleh Factory, Cachar	.. 1865
Manager of the Halmarah, Tea Estate, Assam	.. 1872
Manager, Kocyah Factory, Cachar	.. 1865
Manager, Goomrah Factory, Tirhoot	.. 1865
Manager, Narainpore Garden, Cachar	... 1865
Manager, Joypore Garden, Cachar	... 1865
Manager, Cutlee Cherra Garden, Cachar	.. 1865
Manager of Raj Shewhur, Tirhoot	... 1870
Manager, Noakacharee Tea Company, Assam	... 1865
Manager, Public Garden, Bareilly	... 1868
Manager, East India Tea Company, Cachar	... 1866
Manager, Koomtar Tea Garden, Assam	... 1869

M.—Continued.

	Admitted.
Manager, Chincooree Tea Estate, Cachar ...	1870
Manager, Shillong Tea Estate, Shillong ...	1867
Mandelli, L. Esq., Tea Planter, Darjeeling ...	1868
Manikjee, * Rustomjee, Esq., Merchant, Calcutta ...	1837
Manook, Dr. S. J., Civil Surgeon, Chyebassa ...	1866
Marindin, Capt. P. S., R. E., Allahabad ...	1371
Markby, Hon'ble W., Judge of High Court, Calcutta ...	1866
Marquard, † C. Esq., Merchant ...	1862
Marsden, F. J. Esq., Barrister, Calcutta ...	1870
Martin, W. R. Esq., Tea Planter, Punkabaree, Darjeeling ...	1868
Maseyk, J. W. Esq., Indigo Planter, Jungypore ...	1858
Master, C. G. Esq., M. C. S., Chatterpore via Ganjam ...	1871
Masters, *† J. W. Esq., ...	1835
Matthews, F. E. G., Esq., Kumaon Iron Works, Kaladongee near Nynee Tal ...	1871
Maunsell, Lieut.-Col. F. R., Chukrata ...	1870
McAlpine, Robert, Esq., Futtickcherry Estate, Chittagong ...	1865
McDonell, W. F. Esq., Civil Service, Bankipore ...	1866
McFarlane, A. C. Esq., Merchant, Calcutta ...	1870
Melville, Hon'ble Maxwell, Judge of the High Court, Bombay ...	1871
Mercer, Lieut.-Col. T. W., Dhurumsala ...	1866
Meres, W. F. Esq., Civil Service, Hooghly ...	1870
Meer Mahomed Ali, Zemindar, Furreedpore ...	1872
Mesurier, C. B. Esq., Allahabad ...	1861
Meugens, J. G. Esq., Merchant, Calcutta ...	1865
Meakin, H. G. Esq., Brewer, Kussowlie ...	1872
Millar, Major F. J., Deputy Commissioner, Mooltan ...	1869
Millie, W. J. Esq., Tea Planter, Chittagong ...	1866
Mills, *† Andrew John Moffat, Esq. ...	1836
Mills, Lieut.-Col. H., Dy. Asst. Commissary General, Bareilly ...	1871
Minchin, F. J. V. Esq., Aska, Ganjam ...	1862
Minchin, Charles Esq., Merchant, Bimlipatam ...	1864
Minto, W. Esq., Debrooghur, Assam ...	1862
Mitchell, R. Esq., Merchant, Calcutta ...	1868
Moir, Dr. W., Civil Surgeon, Meerut ...	1872
Mohesh Chunder Banerjee, Baboo, Cuttack ...	1869
Mohina Rungun Roy Chowdry, Zemindar, Kakinia, Rungpore ...	1865
Mohendrolall Khan, Koomar, Narajole, Midnapore ...	1871
Molony, † E. W. Esq., C. S., Commissioner ...	1866
Money, *† W. James Henry Esq., Civil Service ...	1837
Money, † Major R. C. Deputy Commissioner ...	1860

**M.—(Continued.)**

	<i>Admitted.</i>
Monghur Dass, Lalla, Banker, Allahabad ...	1872
Moody, John, Esq., 15, Allypore Road ...	1870
Moore, C. W. Esq., C. S., Azimghur ...	1865
Moran, F. C. Esq., Manager, Rungorah Factory, Debroghur ...	1870
Moran, J. Kenneth, Esq., Merchant, Chandernagore ...	1872
Morris, † J. H. Esq., Civil Service ..	1863
Morris, G. G. Esq., Civil Service, Burrisaul ..	1872
Mordau Ali Khan, Mahomed, Prime Minister, Marwar, Jodhpore ...	1870
Mosely, T. H. Esq., Merchant, Calcutta ...	1862
Mowbray, Arthur H. Esq., Merchant, Calcutta ...	1866
Muir, Hon'ble Sir W. K., C. S. I., Lieutenant-Governor of N. W. P., Allahabad ..	1869
Mullen, † I. Dr. T. French, Residency Asst. Surgeon, Ulwar, Rajpootana ...	1871
Murdoch, A. W., Esq., C. E., Serajgunge ...	1870
Murray, Col. J. J., Commandant, 11th Bengal Cavalry, Deoleo ...	1867
Murray, Capt. W. G., Revenue Survey, Calcutta ...	1870
Murray, Capt. J., Asst. Conservator of Forests, Mussoorie ...	1870

**N.**

NAESMYTH, † J. Esq., Civil Service ..	1852
Nawab, Nazeer Ally Khan Bahadoor, Calcutta ...	1862
Nembhard, † Lieut.-Col. W., Commissioner, East Berar ...	1861
Newton, Thos. Esq., Barrister-at-law, Allahabad ...	1870
Nickels, C. Esq., Indigo Planter, Pusewa Factory, Jounpore ..	1866
Nobin Chunder Nag, Baboo, Zemindar, Midnapore ...	1866
Noble, Capt. C. S., Assistant Settlement Officer, Lucknow ...	1870
Noor Khan, Huzrut, Minister of Jowrah ...	1871
Nreasingapersaud Dass, Baboo, Nubberdeep, Nuddea ..	1872
Nuthall, † Major General W. F., Political Agent ...	1871

**O.**

OBHOYCHURN Goho, Baboo, Merchant, Calcutta ...	1856
Odling C. W., Esq., C. E., D. P. W., Bhuddruck ...	1871
Ogbourne, C. H. Esq., Calcutta ...	1867
Ogilvy, J. F., Esq., Merchant, Calcutta ..	1865
O'Keef, J. W., Esq., Merchant, Calcutta ...	1871
Oldham, † Wilton Esq., LL.D., Civil Service ...	1867

## B—(Continued.)

Admitted

Onmet, P T Esq, Bhangulpore	1857
Onasch, Revd H Ranchee, Chota Nagore	1869
Orchard, Major W A D, B S C, Barrack Master, Meerut	1871
Orr, J Cave Esq, Solicitor, Calcutta	1868
Ori, Lieut-Col Alexander P, Roy Bareilly, Oude	1868
Osborne, Col Willoughby, F R G S, F G S, Political Agent, Bhopal, Sehoie	1862
Osborne, Captain J H Willoughby, Revenue Survey, Debrooghur	1870
Onseley, Gore Esq, Commissioner, Umballa	1872
Owen, † Lieut-Col W G, (12th Madras N I)	1846
Owen, † Lieut-Col A W, Executive Engineer	1865

## P.

PADDAY, Capt, A C, Royal Engineers, Bareilly	1871
Palmer, Charles, Esq, Medical Service, Calcutta	1848
Palmer, * T A G, Esq, Cawnpore	1861
Pariott, Col B, Stud Department, Kurruntadhee	1867
Patterson, A B, Esq Civil Service, Futtehpoore	1871
Paske, Dr C T, Civil Surgeon, Mirzapore	1869
Payne, † Dr A J, Medical Service Calcutta	1860
Payne, H F Esq, E B Railway, Sealdah	1869
Peal, S E, Esq, Tea Planter, Sapakatec, Seebaugor, Assam	1867
Pearl, J Esq, Tea Planter, Rajmore Tea Estate, Seebaugor, Upper Assam	1870
Peary Mohun Banerjee, Baboo, Pleader, High Court, N W P, Allahabad	1868
Peel, Fredk, Esq, Merchant, Calcutta	1871
Pellow, F H Esq, Civil Service, Hooghly	1863
Peppè, G T Esq, Manager Dunwar Estate, Pachamba	1872
Peppe, T F Esq, Chota Nagore	1868
Perkins, Dr R H Benares	1859
Perrin, Monsieur J, Silk Filatures, Berhampore	1859
Pertab Narain Singh, Baboo, Deputy Magistrate, Bood Bood	1863
Peter, James Esq., Lydhacherra Garden, Cachar	1872
Peterson, † A T T Esq, Barrister, High Court	1849
Peterson, Frederick Esq, Secy, Simla Bank, Simla	1862
Phear, † the Hon'ble J B,	1867
Philippe, Clement Esq, Indigo Planter, Balacole, Pubna	1851

## P.—(Continued.)

	Admitted.
Phillips, James Esq, Indigo Planter, Shikarpore via Koosteah ...	1858
Pickance, Lieut, W. John, Madras Staff Corps, Chatterpore, Ganjam District ...	1867
Picachy, Dr David, Purneah ...	1871
Pigott,† William Esq, Broker ...	1864
Pinney, G. F, Esq, Jorshant Tea Company, Assam ...	1871
Plowden,† W. C. Esq, Civil Service ...	1869
Pogose, J. G. N. Esq, Zemindar, Dacca ...	1856
Pollok, Major F. T., (Madras Army) Executive Engineer, Gowhatti ...	1860
Pope, C. H. Esq, Planter, Singhia Factory, Hadjapore Tihoot ...	1872
Porter,† G. E. Esq, Civil Service ...	1868
Pott, A. C. Esq, Merchant, Calcutta ...	1870
Poorna Chunder Roy, Zemindar, Sarapoolly ...	1870
Poulton, Major H. B. A., Bengal Staff Corps, Saugor ...	1865
Powell, Alfred, Esq, Saharunpore ...	1871
Power, Ambrose W. B. Esq, C. S., Hill Tipperah, Comillah ...	1869
Pratapa Chandra Ghosh, Baboo, Calcutta ...	1869
Prentis, C. Esq, Civil Surgeon, Gonnuckpore ...	1866
Prestage, Franklin, Esq, C. E., Sealdah ...	1870
Price, Charles E. Esq, Calcutta ...	1870
Pringle, R. B., Esq, Badalpar Tea Garden, Assam ...	1870
Prinsep, H. T. Esq, Civil Service, Patna ...	1870
Prior, General Chas, Commanding at Dhurmsalla ...	1867
Proprietors, Jugdispore Estate, Becheea, Shahabad ...	1869
Protheroe, Lieut Montague, Madras Staff Corps, Asst. Superintendent of Port Blair ...	1869
Prosono Coomar Banerjee, Calcutta ...	1871
President, Municipal Committee, Allyghur ...	1870
Punchanana Mitter Baboo, Calcutta ...	1870
Pyne, R. Esq, Neelgunge, Purneah ...	1867

## Q.

QUINTON,† J. W. Esq., Civil Service ...	1865
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## R.

RABAN, Col H, Shillong ...	1858
Radcliffe† John, Esq, Merchant ...	1871
Rajah of Bhadawar, Agra ...	1869
Rajah of Kuntul, Mirzapore ...	1871



R.—(Continued.)

	Admitted.
Rajkissen Mookerjee, * Baboo, Landholder, Ooterparah	1836
Ramdass Sen, Baboo, Zemindar, Berhampore	1869
Ram Rungun Chuckerbutty, Zemindar of Hæetapore, Beerbhoom	1869
Ramanath Tagore, Rajah Bahadoor, Calcutta	1842
Ramanymohun Chowdry, Baboo, Zemindar, Rungpore	1861
Ramessur Roy Chowdry, Baboo, Zemindar, Allahabad	1868
Rattray, Haldane, Esq., Asst. Supdt. of Police, Rajmahal	1871
Ravenshaw, T. E. Esq., Civil Service, Cuttack	1865
Reay, Lieut.-Col. Chs., Benares	1871
Redpath, R. Esq., Assistant Superintendent of Police, Myanoung District, Henzadah, Burnah	1868
Reid, J. R. Esq., C. S., Azimgurh	1866
Reinhold, † H. Esq., Merchant	1862
Reilly, Herbert, Esq., Dy Magte, Maldah	1872
Riach, F. S. M., Esq., Dhubiedhur Luckiepoore, Cachar	1870
Richards, * † J. Esq., Merchant	1834
Richardson, H. Esq., C. S., Kishnaghur	1872
Richardson, R. J. Esq., Civil Service, Ghazeepoore	1871
Ridge, W. Esq., Surdah	1866
Ripley, † Lieut.-Col F. W.	1849
Ritchie, D. W., Esq., Offg. District Supdt. of Police, Chyebassa	1871
Robarts, Lieut.-Col. Charles, Commandant, 17th Bengal Cavalry, Oude	1862
Robarts, H. Esq., Indigo Planter, Bellah, Allyghur	1870
Roberts, † Robert, Esq., Chief Auditor, E. I. R.	1870
Robertson, J. C. Esq., Civil Service, Allahabad	1870
Robinson, S. H. Esq., Merchant, Calcutta, (Offg. Secretary, A. & H. S.)	1854
Robinson, † J. Hamilton, Esq., Merchant	1863
Robinson, † W. Esq., District Engr., Delhi Railway	1867
Robinson, W. A. Esq., Umballa	1871
Robinson, Revd. Julian, Allahabad	1869
Rochfort, M. B. Esq., District Supdt. of Police, Rampore Beaulah	186
Rodrigues, F. Esq., Merchant, Calcutta	1871
Rogers, Archd. Esq., Solicitor, Calcutta	1858
Rogers, Lieut., G. W. 4th Goorkas, Bukloh, Punjab	1871
Romanath Law, Baboo, Solicitor, Calcutta	1872
Roodurpurshaud, Chowdry, * Nanpore, Tirhoot	1867
Roordur Purtab Sing, * Rajah Bahadoor, Dewan of Punna	1868
Roquet, V. Esq. Indigo Planter, Moharagunge Factory, Akinghur	1860

R.—(Continued.)

	Admitted.
Ross, † Mars Esq., Merchant ...	1865
Row, Col. W. S., (33rd N. I.) Hazareehagh ...	1854
Row, G. L. Nursing, Esq., Admiralty, Madras ...	1871
Rowett, J. T. Esq., Merchant, Rangoon ...	1871
Ruddock, E. H. Esq., B. C. S., Burdwan ..	1868
Russeed Khan Chowdry, Moulvee, Mahomed, Zemindar, Nattore ...	1871
Russell, T. M. Esq., Calcutta ...	1868
Ruxton, † G. Esq., Merchant ...	1861
Ryder, Lieut.-Col., S. C. D., Umballa ..	1858

S.

SAGORE Dutt, Baboo, Merchant, Calcutta ...	1850
Sage, R. P. Esq., Nurrul, Jessore ...	1872
Samachurn Law, Baboo, Merchant, Calcutta ...	1855
Sandys, Mrs. Annie, Blaugulpore ..	1870
Samuders, F. W. Esq., Lullulpore, ..	1871
Savi, † J. R. Esq., Indigo Planter ...	1862
Savi, Thomas, Esq., Indigo Planter, Kishnaghur ...	1851
Sceales, Jaffray O'Brien, Esq., Chooudangah ...	1869
Schiller, † F. Esq., Merchant ..	1854
Scott, † Capt. G. J., Superintendent, I. G. S. N. Company. ...	1870
Scott, P. G. Esq., Assistant Superintendent of Police, Durbhangah, Tirhoot ..	1869
Secretary, Agricultural Society, Satkhira ...	1871
Secretary, Public Garden, Azinghur ...	1871
Secretary, Local Fund Committee, Umritsur ...	1859
Secretary, Local Fund Committee, Ferozepore ..	1861
Secretary, Public Garden, Banda ...	1855
Superintendent, Model Farm, Cawnpore ..	1860
Secretary, Cantonment Public Garden, Agra ...	1865
Secretary, Assam Company, Calcutta ...	1865
Secretary, Public Garden, Jaloun. Oorai ...	1866
Secretary, Government, Garden, Muttra ...	1866
Secretary, Local Committee, Chidwarrah ...	1867
Secretary, Local Committee, Jahnzie ...	1867
Secretary, Local Fund Committee, Baitool ...	1869
Secretary, Local Fund Committee, Muzuffergurh ...	1869
Secretary, Municipal Committee, Mirzapore ...	1869
Secretary, Road Fund Committee, Jaunpore ...	1867
Secretary, Local Committee, Chanda ...	1870
Secretary, Municipal Committee, Jhung ...	1870
Secretary, Local Fund Committee, Belaspore ...	1871

S.—(Continued.)

	Admitted.
Secretary, Public Garden, Mirzapore ...	1872
Secretary, Local Committee, Hoshungabad ..	1872
Secretary, Public Garden, Bannu ...	1872
Senior, Capt. H. W. J., Superintendent of Jail, Meerut .	1872
Shahamut Allee Khan, Meer Bahadoor, Superintendant of Rutteeana, Indore ...	1870
Shakespear, Major Genl. J. T., Alipore ...	1872
Shamloll Dutt, Baboo Calcutta ...	1871
Sharp, H. G. Esq., C. S. Rancegunge ...	1872
Shaw, J. Esq., Sub-Deputy Opium Agent, Burhurwah, Chumparun ...	1871
Shearin, E. Esq. Merchant, Calcutta ..	1856
Shelley, † Major T. M., late 11th Regiment ...	1871
Shoodial Sing, * H. H. Mohakhan, Rajah of Alwar ..	1863
Sheffer, J. W. Esq., Civil Service, Azimgurh ..	1869
Sherriff, W. Esq., Jorradra, Jessore ..	1859
Shoetz, Dr., James Civil Surgeon, Futtehpore ..	1872
Shillingford, G. W. Esq., Kolassy Factory, Purneah ...	1867
Shortt, † T. H. H. Esq., Civil Service ..	1866
Sibley, George Esq., Civil Engineer, E. I. Railway, Cal- cutta ..	1869
Simons, C. J. Esq., Tea Planter, Borsella Factory, Morar Bazaar Post Office, Upper Assam ...	1863
Simson, James, Esq., Civil Service, Azimgurh ...	1856
Skinner, E. Esq., Tea Planter, Cachar ..	1872
Skinner, A. Esq., The Abbey, Mussoorie ..	1854
Skoulding, J. W. B. Esq., R. A., Veterinary Surgeon, Saharanpore ...	1871
Slater, E. M. Esq., Bank of Bengal, Calcutta ...	1870
Smalley, R. B. Esq., Ramporehaut ..	1867
Smith, G. M. Esq., Joylunga Tea Estate, Lukimpore Assam	1871
Smith, W. Esq., Calcutta ...	1871
Smith, R. H. Esq., Principal Sudder Ameen, Meerut ..	1860
Smith, James Esq., Shahpore, Tirhoot ...	1863
Smith, Thomas T. Esq., Cheretty Factory, Berhampore...	1864
Smith, C. M. Esq., Merchant, Calcutta ..	1865
Smith, W. H. Esq., Civil Service, Allyghur ...	1868
Smith, Maxwell Esq., Hursingpore, Tirhoot ..	1869
Smith, W. Esq., Dorundah Factory, Chota-Nagpore ...	1872
Smyth, Capt. R. G., Hazareebaugh ..	1872
Snow, R. W. Esq., Tea Planter, North Lukimpore, Assam	1872
Spankie, Hon'ble R., Civil Service, N. W. P., Allahabad	1865
Spencer, C. J. Esq., C. E., E. I. Railway, Ucharah ...	1863
Spicer, A., Esq., Tea Planter, Cachar ...	1869

## S.—(Continued.)

	Admitted.
Stalkartt, William Esq., Merchant, Calcutta	1845
Stalkartt, J. Esq., Merchant, Calcutta	1868
Stafford, Brigr. Genl. W. J. F., Commanding Eastern Frontier, Shillong	1872
Steel, Donald, Esq., Eastern Cachar Tea Company, Cachar	1861
Steel, † Lieut.-Col. J. A., Bengal Staff Corps	1868
Steel, Lieut. F. H. R. A., Revenue Survey, Murree Punjab	1870
Stephen, J. Esq., Dacca	1855
Stephenson, Cecil Esq., Agent, E. I. Railway, Calcutta	1866
Sterndale, H. B. Esq., Bank of Bengal, Delhi	1870
Sterndale, † R. A. Esq., C. S.	1871
Stevens, H. W. Esq., Executive Engr., Durbangah	1867
Stevenson, * † William Esq., Junior, M. D.	1834
Stewart, A. N. Esq., Collector of Tolls, Jungypore	1862
Stewart, † Dr. J. L.	1864
Stewart, A. Esq., Manager, Oornabund Garden, Cachar	1870
Stewart, B. D. Esq., Raneejunga	1870
Stocks, J. W. Esq., Berhampore	1866
Stokes, Allen Esq., E. I. Railway, Jamalpore	1867
Stoney, R. V. Esq., Civil Engineer, Ungool via Cuttack	1866
Stoney, T. Butler, Esq., C. E., Dehree, Shahabad	1869
Strachey, † Lieut.-Col. R. (Engineer)	1857
Strand, A. Esq., Stock Broker, Calcutta	1870
Stuart, Alex. Esq., Raneejunga	1863
Stubbs, † Lieut.-Col. W. H., 4th Regt. N. I.	1868
Sturmer, Edwin Esq., Assistant Engineer, Canning Town, Mutlah	1863
Sturmer, John, Civil Engineer, Calcutta	1864
Sturmer, A. J. Esq., Talooka Kojha, via Gazeepore	1866
Sukharam Martund Esq., Indore	1872
Superintendent of the Patna Lunatic Asylum, Patna	1871
Superintendent Central Prison, Benares	1872
Sumbhoo Narayana, Rajah Bahadur, Benares	1872
Supdt. of Jorehaut Tea Company, Assam	1865
Supdt. Serajjunga Jute Company, Serajjunga	1868
Sutcliffe, James Esq., Principal of the President College, Calcutta	1871
Sutherland, Charles J. Esq., Merchant, Calcutta	1838
Sutherland, H. C. Esq., Civil Service, Sylhet	1860
Sutherland, H. H. Esq., Merchant, Calcutta	1870
Sutherland, A. B. Esq., Merchant, Calcutta	1870
Suttyanund, Ghosal, Rajah, * Bhookoyelas (Vice President)	1869
Swinden, T. G. Esq., Calcutta	1855

## §.—(Continued.)

	<i>Admitted.</i>
Swinhoe, William Esq., Attorney, Calcutta ...	1859
Syed Wellayet Ali Khan, Patna ...	1871
Sykes, Arthur L. Esq., Merchant, Calcutta ...	1869

## T.

TAYLOR, V. T. Esq., Civil Service, Bhaugulpore ...	1860
Taylor, W. C. Esq., Cuttack ..	1858
Taylor, Frank, Esq., Executive Engineer, E. I. Irrigation and Canal Company, Hidgelee ..	1868
Temple, the Hon'ble Sir R., K.C.S.I., Calcutta ...	1869
Templer, Lieut.-Col. H. J., Staff Corps, Barcilly ...	1871
Tenant, Major T. E., Waltair, Vizagapatam ...	1868
Thelwall, Col. J. B., C. B., Meer ..	1851
Thomas, J. Esq., Merchant, Calcutta ..	1867
Thomas,† J. P. Esq., Merchant ..	1868
Thomson, John Esq., Merchant, Calcutta .	1872
Thompson,† Lieut.-Col. E., Political Agent ...	1864
Thompson,† Rivers Esq., Civil Service ...	1864
Thompson,* Dr. R. F., Hooghly. ...	1865
Thompson, A. B. F. Esq., Calcutta .	1869
Thompson, J. A. Esq., Chandeeghat Tea Garden, Cachar	1871
Thompson, Henry, Esq., Manager, Moran Tea Company, Seebsaugor, Assam ..	1870
Thompson, Ninian, Esq., Judge, S. C. Court, Calcutta ..	1862
Thorpe, J. Esq., Lucknow ..	1867
Thurburn, E. A. Esq., Merchant, Calcutta ...	1871
Tonnerre, Dr. C. Fabre, Health Officer, Calcutta ..	1862
Toomey, Geo. Esq., Indigo Planter, Conti, Turhoot ...	1870
Trafford, Revd. John, Serampore .	1863
Travers, Major General James, V. C., Meerut	1869
Tucker, W. T. Esq., Civil Service, Bancoorah	1855
Tucker, Robert Esq., Tea Planter, Seebsaugor	1867
Tulloch, Hugh, W. Esq., Merchant, Calcutta ...	1872
Turnbull, C. S. Esq., Silk Manufacturer, Ghuttal ...	1853
Turnbull, the Hon'ble G. D., Civil Service, Meerut ...	1865
Turnbull,† Robert Esq., Merchant ...	1865
Turner, H. B. H. Esq., Merchant, Calcutta ...	1868
Turner, H. G. Esq., Madras Civil Service, Vizagapatam ..	1869
Twynam, Capt. E. J. L., Executive Officer, Prome ...	1856
Tytler, A. G. Esq., Sub-Deputy Opium Agent of Ally- gunge, Sewan ..	1871
Tytler, Major Genl. Fraser, C. B. Commdg. at Umballa...	1872

## U.

UNWIN,† Howard, Esq., C. E. ... 1869

## V.

VANCURSEM, E. C. Esq., Merchant, Calcutta ... 1868  
 Veen, W. Ter, Esq., Merchant, Calcutta ... 1864  
 Vernon, John Esq., Executive Engineer, Debrooghur ... 1871  
 Vertannes, J. C. Esq., Civil Engineer, Contai ... 1865  
 Vizianagram, His Highness the Rajah of\* ... 1847  
 Voigt, S. E. Esq., Merchant, Calcutta ... 1870

## W.

Wagentrieber, W. J. H. Esq., Sonaric, Seebasangor, Upper Assam ... 1868  
 Walker, William, Esq., Tea Planter, Seebasangor, Upper Assam ... 1870  
 Walker, Richd. Chs. Esq., Bohora Factory, Purneah ... 1872  
 Wallace, Adolphus Esq., Rungjann Factory, Golughant, Assam ... 1866  
 Ward, J. D. Esq., Civil Service, Purneah ... 1869  
 Ward,† Lieut.-Col. W. J., 8th Bengal Cavalry ... 1870  
 Warner, Thornton, Esq., Emigration Agent for Trinidad, Kidderpore ... 1867  
 Waterfield, E. Esq., Civil Service, Mozuffernuggur ... 1846  
 Waterfield, William Esq., Civil Service Allahabad ... 1870  
 Wauchope, S. Esq., Civil Service, Hooghly ... 1848  
 Webber, F.V. B. Esq., Civil Surgeon, Dinagapore ... 1868  
 Webster,† H. B. Esq., Civil Service ... 1864  
 Webster,† Geo. K. Esq., Civil Service ... 1866  
 Webster, Alex. L. Esq., Jorehaut Assam ... 1867  
 Weinhold, John Esq., Merchant, Calcutta ... 1869  
 Wemyss, Sir John, Bart, Mirzapore ... 1859  
 Westmacott E. V. Esq., C. S., Dinagapore ... 1866  
 Weston, John Esq., Judge S. C. Court, Magoorah ... 1863  
 White, Robert Esq., Tea Planter, Silcoorie Tea Estate, Cachar ... 1869  
 White, Dr. J. B., 42nd Assam Light Infantry, Assam ... 1872  
 Whitty, Irwin J. Esq., Civil Engr., E. I. Railway Chord Line, Kurmaton, Assensole ... 1867  
 Wight,\*† Robert Esq., M. D. ... 1836  
 Wigram,\* Percy, Esq., Civil Service, Butee, N. W. P.... 1871  
 Wilcox, Frederick, Esq., Bengal Police, Moorolia ... 1867

W—(Continued)

Admitted.

Wilkinson Major A E Cantonment Magte, Lucknow	1862
Wilkinson, C J Esq, Barrister at-Law, Calcutta	1870
Wilkinson, A F Esq, Manager Tellary Concern, Shahabad	1871
Williams, G R Esq, Civil Service, Dehra Doon	1872
Williamson,† Major James	1849
Williamson, Lieut W J Deputy Commr, Garrow Hills, Assam	1867
Wilmot,† C W Esq, Asst Commissioner, Southal Pergunnahs	1859
Wilson,† A G Esq, Deputy Magistrate	1847
Wilson,† Charles Esq Surgeon 1st N I	1860
Wilson Lieut Col H M 1st Regt P I Mooltan	1860
Wilson, H F Esq Serjeant	1870
Wilson, Wm Esq Indigo Planter Bursghat Chuprah	1871
Windle, J A Esq C L Executive Engineer, Calcutta	1865
Wingrove Clement Esq Gowhatti Assam	1871
Winth Charles F Esq Sub Deputy Opium Agent, Goruckpore	1869
Wintle, Capt H R 18th N I Goruckpore	1870
Wintle† Col J H C Cantonment Joint Magistrate	1860
Wise Dr James Civil Surgeon Dacca	1871
Wood James M Esq Native the Debrooghur Assam	1865
Wood C C Esq Assistant Commissioner, Bhingulpore	1870
Woodford Dr C O Calcutta	1863
Wordie, T H Esq Merchant Calcutta	1863
Worgan† J B Esq C S	1868
Wright, Lt-Col J A Cantonment Magistrate, Morar	1871
Wright H Esq Shapore Punjab	1854
Wright A C Deputy Magistrate Secwan	1865
Wright, Dr Daniel Katmandoo Nepal	1866
Wright, W Esq, Judge, Small Cause Court Cuttack	1866
Wroughton† Lt-Col H R Offg Deputy Asst Commissary General	1860
Wurzer, Ally, Nawab, Gaya	1872

Y

Young, Capt Charles Mcwar Bhel Corps, Kherwarrah	1872
Young W Esq, C S Goruckpore	1868
Young, James Esq, Merchant Calcutta	1869
Young, Major Suddons, Commanding at Chunar	1871

Z

Zander, Leo, Esq, Merchant, Calcutta	1872
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### DIRECTIONS FOR BINDER.

The portion of "*Correspondence and Selections*" in the previous number (Vol. ., Part I.,) commenced erroneously with page 49, instead of page 1. The Binder will please note accordingly.





## Correspondence and Selections.

AMERICAN PRIZE ESSAY ON THE CULTURE OF TOBACCO. By H. W. W.  
*The Tobacco Grower's Guide and the Horticulturist's Assistant. Highlight  
 Copy 01*

§ 717.—A rich loam is the soil for tobacco plants. The spot for a bed should be the south side of a gentle elevation as well protected as possible by a dense shrubbery. After a thorough burning of brush dig deep and continue to dig, rake and chop until every clod and stone be removed, then level and pulverize nicely with a roller. As to the variety to plant I think the Cuban is every way the kind for our climate. The Connecticut seedling is the best out culture has more than any thing else to do with the quality. Mix a good soil for every ten square yards with a quart of plaster or sulphur ash, and sow it regularly in the same manner that you sow small seed, only with the finger hand, roll with a hand roller or tramp it with the feet. If the bed is sown early enough it be covered with brush free from leaves, but it is not necessary to cover it after the middle of March. Tobacco beds may be sown at any time during the winter if the ground be not too wet for it. The best time for sowing is from the 10th to the 20th of March, though it is safest to sow at intervals whenever the land is in fine order for working. Never sow unless the land is in good order for the work will be thrown away if the land be too moist or be not perfectly prepared. The beds must be kept free from grass or weeds which must be picked out one at a time by the fingers. It is a tedious and troublesome operation therefore you should be very careful not to use any manures on your beds which have grass or weed-seeds in them. After the plants are up they should receive a slight top-dressing of manure once a week sown broadcast by the hand. This manure should be composed of half a bushel of well raked ashes, (or one bushel of burnt turf) one bushel of fresh virgin woods-earth, one gallon of plaster half a gallon of soot, one quart of salt dissolved in two gallons of liquid from a barn yard and four pounds of pulverized sulphur, the whole well intermixed. Let a large quantity be got together early in the spring or winter rather, and put away in barrels for use when wanted. This and other such mixtures have been found efficacious in arresting the ravages of the fly—both from the frequent dusting of the plants and the increased vigor which it imparts to them, thereby enabling the plant the sooner to get out of the tender state in which the fly is most destructive to it. The fly is a small black insect, somewhat like the flea, and delights

in cold, dry, harsh weather, but disappears with the mild showers and hot suns of opening summer. If possible, the plants should stand in the bed from half an inch to one inch apart, and if they are too thick they must be raked when they have generally become as large as five or ten-cent pieces. The rake proper for the purpose should be a small common rake, with iron teeth three inches long, curved at the points, teeth flat, and three-eighths of an inch wide, and set half an inch apart.

*After-Culture.*—The soil best adapted to the growth of tobacco is light, friable soil, or what is commonly called a sandy loam, not too flat, but rolling, undulating land—not liable to drown in excessive rains. New land is far better than old. Ashes are decidedly superior to any other fertilizer for tobacco. Theory and practice unite in sustaining this assertion. The land intended for tobacco should be well ploughed in April, taking care to turn the turf completely under, and subsoiling any portions that may be very stiff and hold to water near the surface; and let the land be well harrowed directly after breaking it up. It should then be kept clean, light, and well pulverized by occasional working with cultivators and large harrows, so as not to disturb the turf beneath the surface. When the plants are of good size for transplanting, and the ground in good order for their reception, the land, or so much as can be planted in a "season," should be "scraped," which is done by running parallel furrows, with a small seeding-plough, two and a half feet apart, and then crossing these again at right angles, preserving the same distance, which leaves the ground divided in checks or squares of two and a half or three feet each way. The hoes are then put to work and the hill is formed by drawing the two front angles of the square into the hollow or middle, and then smoothed on top and patted by one blow of the hoe. The furrows should be run shallow, for the hills should be low and well levelled off on the top, and, if possible, a slight depression near the centre, so as to collect the water near the plant. The first fine rain thereafter, the plants should be removed from the seed-beds, and one carefully planted in each hill. A brisk man can plant from five to six thousand plants per day. The smaller or weaker hands, with baskets filled with plants, precede the *planters*, and drop the plants on the hill. In drawing the plants from the bed, and carrying them to the ground, great care should be taken not to bruise or mash them. They ought to be put in baskets or barrels, if removed in carts, so that not many will be in a heap together. The plants should never be planted deeper than when they stood in the bed. Planting is done thus: Seize the plants dropped on the hill with the left hand; with one finger of the right hand make a hole in the centre of the hill, and with the left put in the root of the plant. The dirt is well closed about the roots of the plants, (put in with the left,) by pressing the forefinger and thumb of the right hand on each side of the plant, taking care to close the earth well about the bottom of the root.

If sticks are used to plant with, they should be short, and the planter should be careful not to make the hole too deep. The plants should be very carefully planted, for if the roots are put in crooked and bent up, the plant may live but never flourish, and, perhaps, when too late to replant, it will die, and then all the labor will be wasted. In three or four days it may be weeded out, that is, the hoes are passed near the plants, and the hard crust formed on the hills pulled away, and the edges of the hill pulled down in the furrows; this is easily done if performed soon after planting, but if delayed, and the ground gets grassy, it will then be found a very troublesome operation. After weeding out, put a gill of equal parts of plaster and ashes well mixed, upon each plant. In a few days, say a week or less time, run a small plough through it, going twice in a row. This is a delicate operation, and requires a steady horse and a skilful ploughman, for without great care the plants will be knocked up or be killed by the working. In a week after, the tobacco cultivator or plough must be used. Either implement is valuable at this stage of the crop. But once in a row is often enough for either cultivator or shovel-plough to pass. The crop can now be made with their use by working the tobacco once a week for four or five weeks, going each time across the former working. Any grass growing near the root of the plants should be pulled out by hand. As soon as the tobacco has become too large to work without injuring the leaves by the single-tree, the hoes should pass through it, drawing a little earth to the plants when required and levelling the furrows made by the cultivator and shovel. Let this hoeing be well done, and the crop wants no more working. Care should be taken to leave the land as level as possible, for level culture is best.

*Topping*—When it blossoms, the best plants ought to be selected for seed; one hundred plants being enough to save for seed to sow a crop of forty thousand pounds. All the rest should be topped before blossoming—indeed, as soon as the blossom bud is fairly formed. It should be topped down to the leaves that are six inches long, if early in the season, but if late, top still lower. If the season is favorable, in two weeks after a plant has been topped it will be fit for cutting, yet it will not suffer by standing longer in the field. From this stage of the crop, until it is in the house, it is a source of solicitude and vexation to the planter. He is fearful of storms, of frost, and worms, his worst enemy—they come in crowds, “their name is legion”—and the suckers are to be pulled off when they get three or four inches long, they spring out abundantly from the bottom of the plant or leaf where it joins the stalk. Ground leaves are those at the bottom of the plant which become dry on the stalk; gather them early in the morning, when they will not crumble.

*Worms*.—These ought to be pulled off and killed as fast they appear, or they will destroy the crop. Turkeys are of great assistance in destroying these insects; they eat them and kill thou-

sands which they do not eat, for it seems to be a cherished amusement to them to kill worms on tobacco, they grow passionately fond of it—they kill for the love of killing. There are every year two “gluts,” as they are called by planters, the first attacking the plants about the time that they are about one-third or half grown, the other comes on when the tobacco is ready for cutting. The first can be easily subdued by a good supply of turkeys, and if then they are effectually destroyed the second glut will be very easy to manage, for it is the opinion of many intelligent and experienced planters that the greater portion of the first glut re-appears the same year, as horn blowers and breed myriads. When the second army of worms makes its appearance, the tobacco is so large that the turkeys do but little good. The only method then, to destroy them, is to begin in time. Start when they are being hatched and keep up a strict watch upon them, going over the whole field plant by plant and breaking the eggs, killing such as may be seen, and by constant attention during each morning and evening to this business alone with the whole force of the farm, they may be prevented from doing much harm. When they disappear the second time, there is no more cause of trouble.

*Cutting and Hanging.* When the plant begins to yellow, it is time to put it away. It is cut off close to the ground by turning up the bottom leaves and striking with a tobacco-knife, formed of an old scythe—such knives are often used for cutting corn. Let it lie on the ground for a short time to wilt and then carry it to the tobacco-house when it may be put away in three different modes, by “pegging,” “spearing,” and “splitting.” Pegging tobacco is the neatest way and best yet the slowest. It is done by driving pegs about six inches long and half an inch or less square into the stalk about four inches from the big end of the stalk and these pegs are driven in with a mallet in a slanting direction, so as to hook on to the sticks in the house. It is then put on to a “horse,” which by a rope fixed to one corner is pulled up in the house and there hung upon the sticks, which are regulated at proper distances. A tobacco-horse is nothing more than three small sticks nailed together so as to form a triangle each side being three or four feet long. Spearing is the plan I pursue, because it is neat enough and decidedly the quickest plan. A rough block, with a hole morticed in it and a little fork a few inches from the hole for the tobacco stick to rest upon, one end being in the hole and a spear on the other end of the stick is all the apparatus required, the plant is then, with both hands run over the spear and thus strung upon the sticks which, when full, are taken to the house and hung up at once. There are “dart-spears,” like the Indian dart, and “round spears.” Either will do.

“Splitting” tobacco is admired by many who contend that it cures brighter, quicker, and is less likely to *house-burn* or injure from too thick hanging. This mode is pursued easily by simply splitting, with a knife made for the purpose, the plant from the

top to within a few inches of the bottom before it is cut down for housing. Care should be taken not to break the leaves while splitting the stalk. The knife for splitting may be fully described by saying it is a miniature spade. It can be easily made out of an old scythe blade inserted in a cleft white oak handle with its edges bevelled off to the blade so that it acts like a wedge to the descending knife. After the tobacco is split cut down and carried to the house, it is straddled across the sticks and hung up. The sticks are generally supported by forks driven into the ground near the heap of tobacco, for greater convenience to the person putting on the plants. Tobacco sticks are small round sticks or are split out like laths and are about one inch square at one end, or one and a half inches square usually larger at one end than the other, and they should be about eight or ten inches longer than the distance between joists of the tobacco house. As the tobacco cures they may be pulled up closer. After the house is filled some put large fires under it as soon as it has turned yellow and by hot fires it is dried at one end does not change color unless to increase the brightness but firing gives it a smoky smell and taste that is not much liked by buyers. The cost of labor and loss or wear and the risk of loss to the tobacco house are great objections well urged against firing. The best plan is to have sufficient house room and hang it thin in houses not too large, which have windows and doors so as to admit light and air and by closing them in bad weather exclude the rain and dampness, which materially damage the tobacco besides injuring the color of it.

*Stripping* — After becoming dry and well cured the stems of the leaves being free from sap the first mild damp spell of weather it will become pliant and may then be stripped off the stalk. It is first pulled or taken off the sticks and put in piles then the leaves are stripped off the stalk and put in bundles of about one fifth or sixth of a pound in each. The bundles are formed by wrapping a leaf round the upper part of the handful of leaves for about four inches and tucking the end in the middle of the bundle to confine it. There ought if the quality of the crop will permit to be four kinds of tobacco *prime* *light* *dull* and *coal*. When the tobacco is taken down, the cullers take each plant and pull off the defective leaves that are next to the big end of the stalk, and then throw the *prime* to the next person who strips off all of the *prime* leaves (and if there are any yellow leaves he lays them on one side until he has got enough to make a bundle) and throws the plant to the next person who takes off all the rest being the *dull* and the respective strippers as they get enough leaves in hand to make a bundle, throw one side for convenience sake to bulk. Stripping never should be done in dry or harsh weather, unless the tobacco is bulked up almost as fast as stripped. The best plan is not to take down more than you can conveniently tie up in a few hours, but if the planter chooses, he may take down

a large quantity and put it in large bulk, stalk and all, and cover it with tobacco-stalks, and it will keep for many days, so that no matter how the weather be, he can strip out of the bulk. However, this is a very bad and wasteful way. Tobacco should not be too moist or "*high*," as it is termed, when put in stalk bulk, or it will get warm, the leaves stick to the stalk, get a bad smell, and change color, besides, if left too long, it will rot.

*Bulking and Conditioning.*—To bulk tobacco requires judgment and neatness. Two logs should be laid parallel to each other, about thirty inches apart, and the space between them filled with sticks for the purpose of keeping the tobacco from the dampness of the ground. The bundles are then taken one at a time, spread out and smoothed down, which is most conveniently done by putting it against the breast and stroking the leaves downward smooth and straight with the right hand. It is then passed, two bundles at a time, to the man bulking. He takes them and lays them down and presses them with his hands, they are laid, two at a time, in a straight line—the broad part of the bundles slightly projecting over the next two—and two rows of bundles are put in a bulk, both rows carried on together, the heads being on the outside, and the tails just lapping one over the other in regular succession. The bulk, when carried up to a convenient height, should have a few sticks laid across to keep it in place. It must often be examined, and if getting warm it ought to be immediately changed and laid down in another bulk of less height, and not pressed as it is laid down; this is called "*wind-rowing*," being loose and open, it admits the air between the rows of bundles, hence the term. The next process in this troublesome, but beautiful crop, is to "*CONDITION*" it for "*packing*." The *bright*, *yellow*, and *second* tobacco will condition, but most generally in such bulks as I have just described, but it is best to hang up the *dull* as soon almost as stripped. If the bright or second do not dry thoroughly in the bulks, that should also be hung up in the house to become well dried. To properly hang up tobacco to condition, small-sized sticks should be procured, and each one nicely smoothed with the drawing-knife, and kept for that purpose. After it has once been perfectly dry, either hanging up or in bulks—so dry that the heads are easily knocked off, and the shoulders of the bundles crack upon pressure like pipe-stems—it should be taken down, or if in bulk, removed, the first soft, moist spell of weather, as soon as it is soft and yielding enough, as it will become too dry to handle without crumbling or breaking, and it must be put in four or six-row bulks of any convenient length and height, the higher the better, laid down close, so that as little of the leaves or shoulders as possible be exposed on the outside of the bulk. When completed, put sticks and logs of woods, ect., on the top so as to weigh it down. Here it will keep sweet and in nice order for packing at any time, no matter what the weather be, if it was conditioned properly, it will not change a particle while in the condition-bulk.

*Packing.*—Mild, soft, pleasant weather is the best to pack tobacco in the hogshead. The size of the hogsheads is fixed by law, forty inches in the head and fifty-two in the length. Almost any wood will answer to saw into hogshead stuff; the best, of course, is that which is strong but weighs light, such as gum, or beech, or birch, or poplar. No hogshead ought to weigh over one hundred pounds, and staves drawn out of red oak, or other, which make the best, but are too costly, ought not to weigh over ninety pounds.

Having got our tobacco in good order, our hogshead ready, ect., the first mild day that we can spare, we proceed to packing. Let me observe that while putting the tobacco in condition-bulks, all of the bundles that were soft or had an ill smell ought to have been laid one side to be made sweet and dry by a few hours in the sun. The same precaution must be observed while packing. In putting tobacco into the hogshead for packing, a man gets in with *shoes off*, and lays one bundle at a time in a circle, beginning in the middle, and each circle is extended until the outer circle reaches the staves of the hogshead; a single row of bundles is then laid all round the edge of the heads of the last circle, then across the hogshead in parallels with the former. Always keeping the middle the highest; this is called a course. These courses are continued until the hog-head is filled. The man who packs, presses with his knees each bundle in each course, and often stands upon his feet and tramps heavily, but cautiously all round and across so as to get in as much as possible.

This concludes the almost ceaseless round of labor that is necessary to prepare for market this important staple of our country.

I was raised in one of the best tobacco-growing districts in Eastern Virginia, and was familiar with every step in its production for twenty-four years. I moved to this State in the fall of 1844, and have raised more or less of it ever since. Therefore, I ought to be competent to give the "practical information" desired.

*The Seed.*—In Virginia there were as many varieties of tobacco-seed as of corn or wheat. I will name a few: The "Big-Frederick," the "Little Frederick," the "Long Stalk," the "Brittle Stem," the "Big Orinoco," the "Little Orinoco," and half-a-dozen others, each having, or supposed to have, some characteristic distinguishing it from all the others. But the "Brittle Stem" and the "Orinoco" were the varieties mostly cultivated, the former for its early maturity, the latter for its comparative heaviness. There are several varieties, also, in this vicinity, such as the "Brittle Stem," the "Graham Tobacco," and the "Cuban," but the names convey little certain information, as the same varieties bear different names in different localities. But some varieties are evidently to be preferred to others—one, noted for early maturity, all things else equal, is



preferable to another that ripens late. One distinguished for fineness of texture, all things else equal is better than another of coarser fibre, etc. Upon the whole the *surest* and most *profitable* variety is that which ripens earliest and yields the largest number of pounds, cured, to a given number of hills planted.

*Sowing* — In Virginia this was done in the first favorable weather in February, and I have done so here up to the last year. But, hereafter, I shall sow as soon as convenient after the seed is ripe. I was led to this conclusion by this fact: two years I saw millions of plants coming up under the seed stalks of the previous year, the seeds had fallen to the ground, survived the winter, and were more forward than that sowed in February in prepared beds.

*Soil* — It should be moist or convenient to water as it may require watering in dry weather. It should have an open, southern aspect. It should be burned sufficiently to kill the seeds of all weeds and wild grasses for if not then killed they will come on before the tobacco plants and surely destroy them. Hence the importance of *thorough* burning. Having burnt the ground well, rike off the coals and all other rough and coarse materials. When cool enough, dig it up fine and sow the seed. Any one that can sow cabbage or turnip-seed can sow tobacco seed.

*Quantity of Seed* — A table-spoonful of good seed will sow one hundred square yards. Such a bed under favorable conditions, will yield ten thousand plants, and so in proportion. If the bed should need water give it, and finely-pounded sheep-manure sowed over it will greatly expedite the growth of the plants. If the seeds are sowed too thick the plants will be crowded and fail to obtain the proper size at the right time. It is evidently important to have the plants uniform in size and as many of them as possible put out at the first planting. Therefore endeavor to have enough of plants in your bed or beds — to have them all of the same size that all may be planted out at the first planting. When that is the case the pruning, the lopping, and the cutting can all be done regularly. But when planted at intervals of two or three weeks, all the subsequent operations come on irregularly.

With seed sown any time before the first of March in properly-prepared beds, and other conditions favorable, the plants can be set out some time between the twenty-fifth of May and tenth of June. At that time their leaves will be as large as a dollar-piece. Overgrown plants are not desirable. But before your plants are ready you should attend to

*The Kind of Land* — This depends somewhat upon the character of the tobacco designed to be raised. If the object is weight, take old and rich land. The richer, (with animal manures,) the heavier the tobacco, the heavier the tobacco, the coarser will be its character, and, in old-established markets, the less it will bring per pound. Any rich land will bring heavy tobacco, provided it is not too wet. Excessive moisture is destructive to its growth. No

farming product is so effectually destroyed on wet lands as tobacco, and none is so little affected by dry weather. Last season there was no rain in this section from the third July till the thirteenth of October. Other crops were seriously shortened in consequence of such a drought, but better tobacco I never saw grow. I would say, then, that any land, good for any other crop, will bring good tobacco, if it is not too wet.

*The Preparation of the Land.*—To do this well, (and it is greatly to the interest of the grower,) requires deep ploughings and thorough harrowing. Like all other crops, tobacco will do best in land best prepared for it. Having ploughed and harrowed the land, the next step is to lay it off in rows. If the land is old ground, and rich enough to bring eighty bushels of corn to the acre, mark off the rows four and a half feet each way, to the cardinal points, if convenient, but, in any case, as straight as possible. This is to the subsequent thorough ploughings. In Virginia the practice was to make hills as large as a bushel of sand would; but I am perfectly sure that three-fourths of that labor was unprofitable. Nor is it best to plant on a flat surface, for two reasons: first, because the plants are likely to be overflowed in wet spells; and, second, because they can not be as neatly or as well worked with the hoe or plough. For these reasons I would prefer an elevation of six or eight inches, and to obtain it I would throw two furrows together with a one-horse turning-plough. When ready to plant, these ridges should be flattened six inches square, at intervals of exactly four feet, at which points the plants should be set out, just as you would cabbage or tomato-plants. Having planted your crop, the next consideration is

*The Mode of Cultivating.*—When the leaves are half the size of a man's hand, it should be gone over with a cultivator, or what is called here a "double-shovel." Whatever the implement may be, the object of the operation should be to stir the land four inches deep, and kill the starting grass or weeds. This ploughing should be followed by a hoeing, taking the grass out of the hill, and covering the surface all around, and up to the plant. When the leaves are eight or ten inches long, the crop should receive a second ploughing, followed immediately by a second hoeing, with the same general objects. No other hoeing is required, unless the land be very foul, but a third ploughing should be given about two weeks after the second.

Now, the substance of these directions is simply this: to work tobacco, with plough and hoe, in such ways, and at such times, and with the same object in view as you would any other crop, and that is, to destroy grass and weeds, and keep the surface well pulverized. Under favorable conditions, your plants are now in a state to receive another manipulation. But before I proceed to that, I will remark, that I have seen many valuable crops of tobacco raised without any hoe-work—altogether with the plough.

*Priming.*—This consists in pulling off the bottom leaves, to the

number of four or five. Any plant large enough to top ought to be primed first; as a general rule is, not, to prime until the plant is ready to top also. Many good planters omit the priming process altogether, though by that plan they increase the class called "lugs," and lighten their other and better qualities of tobacco. But I would advise all planters to prime their crops. The next work in the cultivation of the crop is called

*Topping*—This is the most important operation yet performed, and simply means pinching out the bud, or cutting off the top of the growing plant—important, from the fact that the operation may leave too many leaves on the stalk to grow, and ripen, if they can, or it may take off some that would have grown and ripened well. It is evident that the growing stalk must be shortened at some point; hence the necessity of the exercise of judgment.

If the directions already given have been duly observed, five-sixths of the crop will be large enough to top and prime in August, and ripe enough to cut by the fifteenth or twentieth of September. But if a rule *must* be given, I would suggest the following: Prime the plant, as above directed, then count as many leaves, from the bottom up, as there are weeks intervening between the time of doing it and the fifteenth of October. I say the fifteenth of October, because that is the time at which killing frosts usually come in this latitude. There are, no doubt, exceptions to this rule; but it is designed only as a *general* one. All conditions favorable, a tobacco-plant will ripen in as many weeks, from the time of topping it, as there are leaves left on the stalk. Consequently, if the topping is done early, it can be topped high, if later, it must be done lower, and if still later, still lower. Planters differ very much at this point. Some will top as high as sixteen leaves, others ten, and a great many at eight. My own opinion is, that a plant topped at ten will weigh as much as one at sixteen, topped at the same time, and on the same kind of land. I think I have been sufficiently explicit on that point. Too much particularity might discourage the learner, therefore, I will next give some hints upon the part of the work next claiming the attention of the grower, and that is

*Suckering*.—About a week after a plant has been topped the suckers will begin to grow. A sucker is only an auxiliary branch which shoots out at the junction of the leaves to the stalk. If not removed, they will grow, and bloom, and ripen seed, and in doing so they will *suck* the parent-stem of much of its vitality. When the crop of suckers are about an inch long they can be pulled or rubbed off, and it should surely be done. In about a week or ten days a second crop of them will appear. These must also be promptly removed, and then the third crop will show itself, which must be similarly treated. The longer they are permitted to remain on the plant, the more they retard its development, and delay its maturity.

*Worming*.—This operation is simply to kill the "tobacco-worms."

These worms are hatched from eggs deposited by what is called the "tobacco-fly." It is a large, dusky-brown, winged miller, nearly as large as a humming-bird. It lays its eggs on fair evenings and moonlight nights in July and August. It can be seen almost any clear evening, among what are called "Jimson-weeds," sucking the flowers. The eggs will hatch out in twenty-four hours, and the worms commence eating when less than half an inch long, and continue to eat till they attain the length of four or five inches. One worm, in six weeks, will destroy a plant so completely as to render it utterly valueless. This pest is vastly more numerous in some seasons than in others. Four years ago there were scarcely any; but for the last three years they have been destructively numerous. The worming of the crop, when they are numerous is, by far, the most disagreeable and tedious labor attending it. Much of the value of the crop depends upon the care or inattention of performing this part of the work. The crop may have been planted in good time—ploughed, hoed, pruned, suckered, topped, cut, and cured well; yet it may have been so riddled by worms as to be comparatively good-for-nothing in market; hence, they must be picked off and destroyed, and that promptly. Having planted in due time, worked, wormed, and suckered properly, the crop begins to show signs of ripeness, and here the question presents itself:

*When is Tobacco Ripe?*—This is, in truth, a simple question, and every one will answer it by saying, when it has arrived at, or attained to, perfection. But the difficulty is, to know certainly when that is—to understand the accompanying indications. To a novice, this is a difficult question, and will remain one until he has seen a specimen—a plant of ripe tobacco; then it is plain. As in many other plants, the ripeness of tobacco is known principally by its color; and it is no easy matter to describe, with absolute accuracy, any particular shade of color; but there are other signs accompanying, which have reference to the general appearance of the plant. With a little judgment and discrimination, the following general rule will be found to answer. I will first observe that, all things favorable, tobacco can be pruned and topped in six or seven weeks after planting; and may be cut in as many weeks, after topping, as there are leaves left on the stalk.

When a plant begins to ripen, it will gradually assume a "piebald" or spotted appearance. As the ripening advances the spots will become more distinct and individualized. When the spots can be distinguished at the distance of ten steps, and the leaves of the plant turn down, become stiff to the touch, and their ends curl under, the plant is ripe, and should be cut. From the moment it has arrived at maturity it begins to decay.

*Cutting.*—Remember that all the plants in your crop are to be hung after they are cut—hung on something, and by something. Prepare a knife—a butcher-knife answers well—have it sharp—enter it at the top of the plant, where the top was broken off. Enter

it centrally; press it downwards, dividing the stalk into two equal portions. Continue it downwards till within five inches of the ground. Withdraw the knife, and cut off the stalk close to the ground. The plant is now cut. Lay it on the ground with the lower end towards the sun. The plants should be placed in rows as they are cut, in order to facilitate the labor of gathering them. There is one caution to be heeded in cutting tobacco, and that is, do not let it be burnt or *blistered* by the heat of the sun. In some varieties of tobacco this will be effected in one hour; in others, not so soon. But this danger can be evaded in two ways: first, by cutting late in the evening; second, by throwing it in the shade, or covering it so as to weaken the power of the sun. Some varieties of tobacco will wilt (that is, become soft or limber) in two hours; others, in a longer time, according to the degree of sun-heat. Having cut the tobacco, and it being sufficiently wilted, the next step is

*Hanging.*—The sticks to hang the plants on should be split of straight-grained timber—should be four and a half feet long, and at least one inch thick, and one inch wide. The splinters should be shaved off smoothly. The poles for the scaffold should be of sufficient length and strength; the forks, or other supporters, must be tall enough to swing the plants six inches above the ground. These scaffolds can be erected around the fields, if small, or in it, if large. Judgment must determine.

The scaffolds erected, the sticks prepared, the tobacco well wilted and placed in piles around the scaffolds, the next business is to hang the plants on the sticks. To do this neatly and expeditiously, place one end of a stick on the outer end of one scaffold-pole, and the other end squarely across on the end of the adjoining pole, or any where else, to be convenient to receive the plants. Hang twelve plants on a stick, and the same, or some uniform number, on every stick. To hang a plant, lift it up with the right hand, and with the left divide the stalk through the split, having half the leaves on one side and half on the other. As the sticks are filled, place them on the poles of the scaffold, crowding them closely. Under the most favorable circumstances, all the plants of a crop will not ripen the same day, or even the same week. It often happens that three weeks intervene between the first and the last cutting. But whenever ripe, it must be cut, hung, and placed on the scaffold, or on some other fixture, to dry out. This *drying* is the first step in the process called *CURING THE TOBACCO*, which simply means to dry out all the juices of the plant. This can only be done by absorption, assimilation, and evaporation. The two former are natural processes; the latter can be effected by heat, and this heat must be from the sun or from ordinary fire. It is important, for many reasons, that this evaporation be as rapid as possible. Left to the sun alone, it would require, in ordinary seasons, at least three months. I have seen plants of ripe tobacco of a green color in January; and I have seen whole crops perfectly

cured by fire in five days. The latter was the plan in Virginia, the fire being kept up night and day during that period. I have not used fire for that purpose since I came to this State seventeen years ago. But whether here or any where else, if large quantities of freshly-cut tobacco be stored in a close house, it will rot or mould during long spells of warm, damp weather, if fire were not used. Tobacco well ripened, and timely cut, in ordinary seasons, can be cured by the first of January, without fire, if suffered to remain on the scaffolds a week, and then placed in sheds with open end and sides: but the roofs should not leak. Rains will not injure it any time during the first eight or ten days after cutting, in any other way than by delaying the process of curing. It may be asked: "Are there any certain signs or indications to show when tobacco is perfectly cured?" I think there are; and with the exercise of a little judgment, there can be no mistake. There should not be the least greenness of color or scent about the stalk, the stem, or any portion of the leaf; and the stems should be so brittle that they will snap short in bending them, in dry weather. With fire it can be put in such a condition in one week; but without fire, in ordinary seasons, it will require till Christmas. But when it is in that condition it is cured. The tobacco being cured, the next process is

*Stripping.*—This consists of breaking the leaves from the stalks and tying them into bundles, called "hands" in this section. But in doing this we should not tie the leaves as we come to them. In all crops, and sometimes on the same plant, there are some long leaves, some short ones, (equally good in quality,) and some dusty, ragged, weather-beaten leaves. These grades or qualities should not be tied up in the same bundle. In stripping, the practice was, in Virginia to let one person pull off all of the first grade, and tie it up; another would take the same plants and pull off all leaves of the second grade, and tie it; and another would pull off and tie up what was left on the plant: thus making three grades or qualities. These are re-hung separately, and prized in the hogsheds separately. This is evidently the proper plan to be followed every where.

Every day's stripping is placed on the same sticks again, and hung up out of the way of every thing. The bundles of the first grade contain twelve leaves; the second, sixteen; and of the third, between twenty and thirty.

After tobacco has begun to dry out, or cure, it can be handled only in moist weather. At any other time it will break and crumble more or less. In order to have it ready to strip at any time, the planter should select a spell of moist weather, and while the tobacco is in the right case, (as it is called in Virginia, and means neither so dry as to break, nor so damp as to mould,) bulk down a considerable portion of his crop.

*Bulking down.*—Suppose he wishes to bulk down three hundred sticks, making three thousand six hundred plants. The

tobacco being in the right "case," he selects a corner of his barn, or other building, and sweeps the floor clean. He then takes down the sticks, slips the plants off, and places them, straight and compact, in one corner of the room, about one foot from either wall, butts outside. And so of another stick by the side of the first, keeping the course parallel with the wall; and when one course is completed, lay down another with the butts on the opposite side. Let the length and number of these courses be such, that the bulk when completed, will be about three feet high. This done, lay the tobacco-sticks on the bulk lengthwise, and cover over with hay or fodder, pressing it tightly between the wall and the bulk. If this is done rightly, the tobacco will remain in stripping case for years. Suppose your whole crop is stripped and re-hung, which ought to be done by the first of March. Let it hang until about the first of April; then take it down in the proper prizing case, and bulk it away as before. The prizing case for the first and second grades is the same as for stripping; but for the first grade it must be decidedly drier.

*Preparing for Market.*—The crop is now ready to prize for market. Parcels less than one thousand five hundred pounds may be carried to market almost in any way; but more than that should be prized in hogsheads. Several farmers might combine their crops for prizing. As to the size, form, and materials of the hogsheads. In Virginia, the size of the hogsheads is prescribed by law. They must be made of seasoned pine or poplar. They must be four feet six inches long; three feet six inches in diameter, at one end, and three feet four inches at the other. This difference of diameter is to allow the tobacco to be inspected. This may be something new to persons of the North, therefore I will explain the mode of inspecting tobacco in the hogshead. An inspector is appointed by law to inspect or examine the tobacco prized in hogsheads. His first step is, to place the hogshead big end upward. He then removes the huing, and takes out the head. He next inverts the position of the hogshead, that is, puts the little end up, and raises it entirely from the tobacco. The mass of prized tobacco stands before him without a covering. The outside may be all right, but his sworn duty is to examine it through and through, as well as round and round. For this purpose he drives an iron bar to the middle, near the top of the mass, pries up and takes out a handful of bundles. He repeats that operation on two other points of the mass. He then inspects or examines the parcels extracted, and rates the whole hogshead according to their quality. The hogshead is replaced and made secure. The hogsheads and the samples taken from them bear corresponding marks, and the former is sold by the latter.

The staves of the hogshead must not be wider than five, nor narrower than three inches, five-eighths of an inch thick, and dressed on the inside. The heading must be seasoned pine or poplar, and one inch thick, with eight hoops. Such a hogshead

will well answer in other States as well as in Virginia.

*Prizing.*—Weigh out, say, three hundred pounds. It takes two hands to do this work, one inside the hogshhead and the other out. One is called the packer, the other the waiter. The packer so arranges the bundles, in placing them, as to make four courses in one layer. Repeat the layers until the three hundred pounds are packed. The weight (lever-power) is then applied. After six hours, put in two hundred pounds more and apply the weight. Six hours, and so on, until one thousand three hundred or one thousand five hundred pounds have been put in. The softer the tobacco, the more of it can be put in a hogshhead.

If the tobacco is of the first quality, fifteen hundred pounds is enough. But if lower qualities, eighteen hundred pounds can be put in. The finer the quality the less weight it can bear without injury; and *vice versa*. Having prized the crop, it is ready for market.

I think tobacco is decidedly the most profitable crop raised in the Western and Northern States. For instance, an acre of spitable land, planted in ture, with good plants, and promptly attended in its subsequent management, will yield a thousand pounds, which, at \$4 per hundred, would be \$40; at \$1 per hundred \$100. The article is now selling by the hogshhead in Louisville, Ky; at more than \$30 per hundred. When the tobacco market opens in May, I have no doubt it will be much higher. Its cultivation is extending most rapidly in Ohio.

## JUTE PRODUCTS.

At the Dundee Industrial Exhibition, just held, two interesting cases were shown by Messrs. Cox Brothers, filled entirely with specimens of jute goods in various stages of manufacture. The commerce in this fibre is now enormous. Fifty years ago jute was almost unknown in this country, except in the form of gunny bags, used in the importation of sugar, rice, and other Indian products. To the late Mr. Neish is due the credit of first bringing it under the notice of our local manufacturers. The history of its introduction is well known. It had to make its way slowly at first in face of strong opposition. Manufacturers had a prejudice against it, and prophesied nothing but failure. Aversion and prejudice, however, have long since disappeared. Its capabilities for employment in such fabrics as sacking, matting, and carpeting are now established, and a limit can hardly be set to the development of the trade. The applicability of jute to paper-making has likewise been demonstrated, and the direct trade between Calcutta and Dundee will doubtless go on increasing from year to year. The cases exhibited by the Messrs. Cox Brothers are models of completeness. On looking at them, one can hardly realise that the once-despised Indian weed could be made available for so



many purposes, alike useful and ornamental. The stalks of jute at one end of the case certainly look an unpromising subject to deal with. Their dark, woody-like bark is about the last thing one would look to as the original base of the beautiful carpets at the other end of the case, or those mysterious contrivances above, which are hardly distinguishable from some of the more pronounced head-gears to which many of the female persuasion take so kindly. The stalks of jute are shown as cut down in the field. A model bale illustrates the mode in which the fibre is packed, and specimens are shown of the fibre in its various stages. Then follow specimens of yarns and cords, adapted for various purposes. The case devoted to manufactured goods illustrates in a very striking manner the wonderful adaptability of the fibre for purposes the most dissimilar. Specimens of cloth are shown, from coarse nail bagging to fine towelling—from different-coloured paddings and pocketings for tailoring purposes to crumcloths and carpets which, so far as appearance goes, both for design and colour, compare not unfavourably with those made from wool. The following is a detailed list of the contents of the two cases:—

Stalks of jute cut from the fields where grown; miniature bale, showing style of packing as imported; jute stick, cut jute, jute butts or cuttings, teased jute cuttings, hackled jute, teased jute tow—various qualities selected from a bale. Jute slivers (after being carded), jute rove bobbins (ready for spinning from), 3 lb. jute line yarn, 4 lb. do., 4 lb. 2-ply do., from the finest long jute hackled, 3 lb. F jute tow yarn, 4 lb. do., 8 lb. do., 16 lb. do., 40 lb. do., from the finest qualities; 8 lb. M do., 20 lb. do., 100 lb. do., from the medium qualities; 10 lb. D jute tow yarn, 20 lb. do., 30 lb. do., from the dark sticks; 20 lb. sacking tow yarn, 40 lb. do., 60 lb. do., from waste and hard ends. 100, 140, 180, 300 lb. rove, 280 and 800 lb. twists, used for various purposes, such as hearthrug making, etc. Jute cords, jute twines (red, blue, and marled), for parcel tying; jute rope, for clothes-lines, etc. Jute yarns (dyed), for carpet purposes; jute roves (do.), for do. The manufactured goods in the second case comprise hessians (different qualities), for bags, bale wrappers, etc. Striped beddings, twilled striped bedding, bed sacking and ticks, for mattresses and bedding purposes. Meal bagging, twilled striped meal bagging, sent to the United States for grain, meal, and flour bags. Brown and black paddings, brown and black pocketings, for tailoring purposes. Bleached osnaburghs, for flour and sugar bags; checked hessians, for horsecloths; diaper and serge twills, for towelling and sheeting; girthing, for upholstery and saddlery purposes; twilled striped sacking, for corn and coal sacks; brown and bleached striped canvas, for American slop purposes; bleached, twilled hop pocketing, for hop purposes (Continental); fine twilled striped sacking, for Continental farmers' purposes; tarpaulin; sugar-pressing cloth; nail-bagging; serge twill matting; carpeting; crumb-cloths, printed and woven, etc.

# Monthly Proceedings of the Society.

*Thursday, the 23rd January, 1873.*

**J. A. CRAWFORD, Esq., President in the Chair.**

The proceedings of the last Monthly Meeting having been read and confirmed, the Chairman read the Annual Report from the Council, which was adopted.

The members next proceeded, in accordance with the Bye-laws, to the election of Officers in Council for the current year as follows :

*President.*—Mr. J. A. Crawford, c. s.

*Vice-Presidents.*—Mr. A. H. Mowbray, Baboo Ramna Nath Tagore, Mr. Saml. Jennings, and Mr. W. Stalkartt.

*Secretary.*—Mr. A. H. Blechynden.

*Council.*—Messrs. R. Blechynden, B. D. Colvin, Baboo Pratapa Chandra Ghosa, Peary Chand Mittra, Dr C. Fabre Tonnerre, Messrs. John Scott, A. Rogers, E Broughton, Baboo Gnnendra Nath Tagore, Messrs. W. Swinhoe, S. H. Robinson, and Rajah Suttanund Ghosal Bahadoor.

The ordinary business was then proceeded with and the following gentleman was elected an Ordinary Member.

J. White, Esq., Junr.

And Lieut.-General P. F. Storey intimated his desire to rejoin, which was agreed to.

The names of the following gentlemen were submitted as candidates for election :

J. F. Stratton, Esq., Political Agent, Nowgong, Bundelkund,—proposed by the President, seconded by Mr. S. H. Robinson.

H. Luttman Johnson, Esq., Civil Service, Calcutta,—proposed by the President, seconded by Mr. R. Macallister.

James Stewart, Esq., Assistant Engineer, Umballa,—proposed by Mr. S. H. Robinson, seconded by the President.

J. P. Hicks Lyne, Esq., Calcutta,—proposed by Mr. A. Blechynden, seconded by Mr. W. Stalkartt.

Baboo Deoraj Luchmun Narain,—proposed by Mr. J. K. Moran, seconded by Dr. C. Fabre Tonnerre.

Lieut. P. Stirling, 92nd Gordon Highlanders, Chuckratta,—proposed by Mr. F. Halsey, seconded by the President.

W. T. M. Dennison, Esq., Kuriyan Estates, Baitenzerg, Java,—proposed by Mr. J. M. Wood, seconded by Mr. S. Jennings.

The following contributions were announced :

Journal of the Asiatic Society of Bengal, Part II., No. IV., 1872, from the Society.

Proceedings of the Asiatic Society of Bengal, Part X., December 1872, from the Society.

Journal of the Asiatic Society of Bengal, Part I., Nos. III. and IV., 1872, from the Society.

#### NEW GARDEN.

1. Read letter from Mr. A. H. Blechynden, the Secretary now in London, announcing the employment of Mr. William Head, as head gardener for the Society's New Garden at Alipore, Mr. Blechynden writes: Mr. Head has been employed for the last two years as one of the Foremen at the Royal Garden, Kew. Mr. Smith, the Curator of the garden, testifies to Mr. Head's first-rate knowledge of practical gardening in all its branches. Mr. Barron of the Royal Horticultural Society, Chiswick Garden, also testifies to Mr. Head's great and varied experience in many of the best gardens in England, and he is recommended by Dr. Hooker of the Royal Gardens, Kew. Noted.

#### SEED POTATOES.

2. Read letter from Mr. E. Buck, c. s., intimating that he is importing a quantity of seed Potatoes from England, for experimental sowing in India, and that a portion thereof may be had at cost price. Noted.

#### AGRICULTURAL MACHINERY.

3. Read letter from Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, soliciting information respecting the fibre-cleaning machines, Sandford and Mallory's, referred to in the Proceedings of the Society, pages 16 and 29, of the Journal, Vol. XIII., Part I., and Vol. I., Part IV., whether they were ever tried in this country, and whether the Society knows of any machine that will work the aloe and agave leaves satisfactorily.

Ordered—A reply be sent to the effect, that the Society are not aware of these machines having been introduced into the country, nor have they any record of machinery found to work satisfactorily the aloe and agave fibres.

4. Read letter from the Agent of the Reclamation Fund, State Capital Sacramento, California, soliciting information on the working of steam ploughs in Bengal. A reply to be sent that steam ploughs were tried in two Indigo Concerns in Bengal, but it is believed they were not found successful.

#### TAVOY HEMP.

5. Read letter from Officiating Assistant Secretary to the Chief Commissioner, British Burmah, sending specimen of some Tavoy hemp, and requesting information as to its market value in Calcutta.

The Officiating Secretary submitted the Fibre Committee's report on this hemp, which was agreed to be published as follows:

*Taroy Hemp* known in Bengal as *Sunn Hemp*. Known and wanted in European Markets. Value in London, £ 16 to 25 according to quality.

Quality of sample very poor.

In rough state, Calcutta value Rs. 3 to 4 per Bazar maund, 82 lbs. 2 oz., in dressed state Calcutta value Rs. 8 — J. H. HUTCHINSON.

*Tavoy Hemp* similar to *Sunn Hemp*. The samples sent are not well prepared, being apparently oversteeped and consequently very weak. If properly prepared would be worth about 5-8 per Bazar maund, undressed.—W. STALKART.

#### BRICK-TEA.

6. The Officiating Secretary submitted samples of some brick-tea, bought at Moscow—sent by Mr George Smith of Serampore, for report and valuation.

Following is the report of the Tea Committee on these samples:

The large sample is made up of stalks and the coarsest of leaves, stuck together by some means. In cup, the liquor is of a thin and pale-straw color, and in taste is filthy and decidedly unclean. It has no briskness or pungency, and has nothing to recommend it except its portability.

I saw some tea (brick) sold in London at public auction, very much like this, at 2½ d per lb. but feel quite sure that the Commissioner of the Public Health would now-a-days prohibit the sale of such rubbish.—J. THOMAS.

Common brick tea giving a very poor liquor; London value, about 3d. per lb.—C. T. INSKIP.

#### COTTON.

Mr. Smith also sent a sample of some Cotton exhibited for sale at the Nijni Fair, in Central Asia, and which has been reported on as follows:

This sample resembles to a great extent the class of Cotton which comes to this market from the Mirzapore District.

It has a strong staple, although a little short and a trifle coarse, but in quality and cleanliness equal to this sample, would be worth at the present moment, from Rs. 17 to 18 per maund, and would be suitable for the China Market.—J. THOMAS.

#### COMPTON'S MANURE.

7. The Officiating Secretary reported that the Compton's Patent Manure, received from the Government of India had been all distributed, and no more was at present available in Calcutta. That there had been several more applications for it, and that Messrs. Compton & Co.'s Agent had reported more on the way, expected about May next, which may be had at £ 9 per ton. They have, however, available now some super-phosphate of lime and crushed bones, for purposes of manure, the former at 2-8, and the latter at 2 per maund.

COMMUNICATIONS ON VARIOUS SUBJECTS.

8. Read letter from J. S. Armstrong, Esq., C. S., Hajipore, 'sending specimen roots and leaves of some dye-yielding tree, and requesting to be furnished with its botanical name.

Read also a letter from W. Smith, Esq., of Chota Nagpore, forwarding a tuberous root and asking its name. The Officiating Secretary stated that these specimens had been sent to Dr. Geo. Henderson, the Officiating Superintendent of the Royal Botanical Garden, who has kindly reported as follows :

The leaf and root forwarded by Mr. Armstrong from Hajipore, belong to a species of *Morinda*, of the natural order Rubiaceæ. From such a fragmentary specimen, however, *without flowers or fruit*, it is impossible to say what the species is, but probably it is the *Morinda Tinctoria* of Roxburgh.

The tuberous root sent from Nagpore by Mr. Smith, belongs to a species of *Curcuma*, but it is impossible to say to what species it belongs, without a more perfect specimen.

And now having answered your correspondents' questions as far as it is possible to do so, allow me to suggest that a note be printed occasionally in the Society's Journal, in some prominent place, requesting members when they send plants to be identified, always to send specimens with flowers, and, if possible, fruit. And if the specimen is nicely pressed between newspapers and changed twice a day, until it is *quite* dry, a very great deal of trouble is saved in identifying it.

VINE BLIGHT.

9. Read letter from Mr. R. H. G. Mathews, submitting specimen of stalks of vine plants, attacked by some destructive grub, 'soliciting information how to stop the ravages.

Dr. Tonnerre kindly offered to examine and report on this.

SILK WORM EGGS.

10. Read application from Capt. James Murray, of Deyra Dhoon, for eggs of silk worms.

The Officiating Secretary reported that Mr. E. G. Buskin had kindly promised to obtain such as may now be procurable.

EXHIBITION OF PLANTS.

11. Mr. C. E. Price exhibited a well grown plant of the *Pothos Argentea*, and some seedlings of *Cyclamen Persicum*; Mr. T. M. Francis exhibited specimens of *Heartsease*. Mr. Jennings and Dr. Tonnerre were appointed judges, and awarded 5 marks to Mr. Price for his *Pothos Argentea*, and 2 marks to Mr. Francis for his collection of *Heartsease*.

PRESENTATION OF EXOTIC PLANTS.

12. Mr. Samuel Jennings presented to the Society for the new garden, a

consignment of Exotic plants from Messrs. James Veitch and Sons, King's road Chelsea.

**ANNUAL FLOWER AND VEGETABLE SHOW.**

13. Resolved, that Wednesday, the 19th February, be fixed for the Annual Vegetable and Flower Show, to be held in the Town Hall, and that the Council be requested to make the necessary arrangements.

*Thursday, the 27th February, 1873.*

**J. A. CRAWFORD, Esq., President in the Chair.**

The Proceedings of the last meeting were read and confirmed.

The following gentlemen were elected ordinary Members :

Messrs. J. F. Stratton, H. Luttman Johnson, James Stewart, J. P. Hicks Lyne, Baboo Deoraj Luchmun Narain, Lieut. P. Stirling, and Mr. W. T. M. Dennison.

The names of the following gentlemen were submitted as candidates for election.

R. E. Watling, Esq., Manager, E. I. 'Railway' Company's Oil Factory, Manowrie, near Allahabad,—proposed by Mr. S. H. Robinson, seconded by Mr. A. Rogers.

Dr. John Curdy Shaw, Civil Surgeon, Mymensing,—proposed by Mr. T. H. H. Shortt, seconded by Mr. S. H. Robinson.

Captain H. P. Nash, 2nd Goorkha Regiment, Dehra Dhoon,—proposed by Dr. W. Jameson, seconded by Captain H. Senior.

H. Firth, Esq., Emigration Agent for Demerara,—proposed by Dr. C. Fabre Tonnerre, seconded by the President.

Bhoojender Bhoosun Chatterjee, Zemindar,—proposed by Mr. A. Rogers, seconded by the President.

Capt. A. R. Wilkinson, Dist. Supdt. of Police,—proposed by Mr. S. H. Robinson, seconded by Colonel H. Rabau.

Dr. J. H. Hazlett, Hamilton Austruther, Esq., and E. Angelo, Esq., intimated their desire to rejoin—agreed to.

The following contributions were announced :

Proceedings of the Asiatic Society of Bengal, No. 1, January 1873.

Patent Office Report for 1868, in 4 vols., from Government of United States of America.

Memoirs of the Geological Survey of India, Palæontologia Indica, Vol. IV., Part 2, from the Superintendent.

Report on the Administration of Bengal 1871-72, from Government of Bengal.

Some seeds of Nux Vomica from the Orissa Coast jungles, from Mr. H. A. Harris.

Seeds of *Kentia Wendlandtiana* and *Ptychosperma Alexandria*, from Australia, from Dr. Geo. Henderson, Officiating Superintendent of the Royal Botanical Garden.

An assortment of 37 packets of seeds from New Zealand, from John Thomson, Esq.

Wight's *Icones Plantarum Indiarum Orientalis*, in 5 Vols., from Dr. C. J. Simons of Assam.

Agreed, that the special thanks of the Society be awarded to Dr. Simons for his valuable presentation, and that the Volumes be carefully and well re-bound.

#### MAHOGANY SEED.

Read the following letter from Dr. Geo. Henderson, Superintendent, Royal Botanical Garden.

"In the Society's Journal for 1867, Vol XIV., page 200, was published a list drawn up by Dr. J. Cleghorn of places to which mahogany trees had been sent from this garden. The tree as you are aware thrives admirably in Calcutta, in fact there is no tree, not even those indigenous to Bengal, which thrives better, but with the exception of one or two trees in Calcutta and two at Barrackpore, none of the others have ever seeded I believe, and I write to call the attention of members of the Society to the fact that the mahogany seed ripens about the end of February or beginning of March, and, if not gathered, is soon blown away by the wind. Possibly some members of the Society may be in localities where some of the trees are growing and should any of them be seeding, I hope they will either have the seed sent here as soon as it is ripe (for, it will not germinate if kept for any time) or will see that it is not lost. The following is a list of places in the Bengal Presidency to which plants were distributed from this garden :

"The City of Agra.

"Jaggernaut Gardeb.

"Public Road at Serampore.

"Barrackpore Park.

"Botanic Garden, Seharanpore.

"Rameserpore Plantation.

"Ghazeepore.

"Avenue, Dum-Dum.

"Government House, Barrackpore.

"Kidderpore School.

"Berhampore.

"Esplanade, Calcutta.

"Agri-Horticultural Society.

"Darjeeling Road.

"Barrackpore Park.

"Plants were also sent to "

"Madras.

"Bombay.

"Nepaul.

"Rangoon.

"Bushire.

"Kumaon.

"Vizagapatam.

"Pondicherry.

"Tenasserim.

"Assam.

"Arracan.

"Akyab."

The Officiating Secretary reported he had already communicated the purport of this letter by Circular to many of the members

# TEA BLIGHT.

Read the following from Mr. A. H. Blechynden, the Secretary now in England, in reply to the enquiry ordered at the Society's Meeting held on the 19th September last, respecting the specimen of blight received from the Manager of the Moran Tea Company.

"I have received the insect referred to in your letter of the 5th December last, alluded to in the letter from the Manager of the Moran Tea Co., Assam, as published in our Proceedings for September, and have now the pleasure to enclose a report thereon from Mr. Moore of the India Museum, from which, you will see, that the same species of beetle has been previously sent to our Society.

"I take this opportunity to correct a mistake of the Manager. In his letter to you he writes, that some bugs were sent down in 1871, to the Society by some Cachar planters as infesting Tea plants, and causing damage, and that these, on examination and report here were declared to be "perfectly harmless." The Manager's remarks evidently refer to some insects which Mr. Buck, Settlement Officer at Fettegurrh, sent to the Society, as destructive to mustard and wheat crops. These were sent to Mr. Grote who, on the authority of Mr. Moore, pronounced them to be harmless ladybirds which feed on *aphides* which injure sursoo and other crops. (See Mr. Grote's remarks in Proceedings of September 1871.)

"You will observe allusion made by Mr. Moore to another kind of tea blight. This refers to the "Tea Bug" noticed in a letter from Mr. S. E. Peal, of Sibsagar, Assam, in a letter to the Editor of the *Engishman*, dated 18th September, 1872, which I brought to Mr. Moore's notice. I enclose a printed copy of Mr. Peal's letter, which it would perhaps be as well to reproduce in our Proceedings, as the subject of tea blight is attracting so much attention at present."

Following is copy of Mr. Peal's letter to which Mr. Blechynden refers:

"I hear from various sources that a blight is now pretty common among the tea-trees in Cachar.

"From what I am told, it much resembles a blight which is steadily on the increase in Upper Assam, and which, at no very distant date, will probably cause more or less of a panic among holder of Tea property, inasmuch as it affects the out-turn of a garden to the extent of twenty per cent. or more (already).

"The general appearance of a garden affected is that the shoots have a brownish spotty appearance, and shrivel up.

"On closely examining a tea-tree, so affected, early in the day, a very minute insect may be seen here and there on the young shoots, generally on those freshly punctured alone, as the insect is, while young, so small, it is not readily detected, and is of a pale tea-liquor color.



"It is a true bug, and may be known by having no *jaws*, and only *xyrobores*, and by its long antennæ or feelers.

"As it increases in growth, the color deepens to a rich dark orange, and is semi-transparent; in fact, it is distended with tea-liquor; eventually it becomes winged, and changed to a white and black insect, not unlike a large mosquito, but with a very characteristic spine on the back like a drumstick.

"If the insect be carefully watched, it will be seen to slowly puncture the leaf (or tip), always young soft leaf too, and, after sucking some time, puncture other places near the first spot, after a little time turning brown, as the tissues near the wound oxidise.

"Colonel Money evidently alludes to the bug at p. 221 of his Essay in the A. and H. Society's Journal.

"Many blights attack tea, some the stem, others the old leaf, but very few, indeed, except this one, is our *direct competitor for young leaf*. Indeed, I believe it already far exceeds in damage all others put together.

"With the exception of a few tea-planters near here, I think very few are aware of the cause of this blight.

"Some time last year I forwarded specimens to the Indian Museum, where, I have no doubt, planters who visit Calcutta can see them. I also forwarded drawings of how they attacked the leaf, and shrivelled it up. Trees badly attacked not only look *withered*, but have all the appearance of having been severely plucked, although not a shoot may have been taken, for when the pekoe tip is punctured, it *dies*, and the eyes lower down all shoot out, and in turn are soon after killed. It seems as prevalent in the open as under shade; in highly cultivated tea quite as much as tea in jungle. I have never found it on anything except *tea*, and believe there is no more chance of curing it than of killing all the mosquitoes in Bengal."

Mr. Frederic Moore, of the India Museum, London, reports as follows:

"The insect, which your correspondent of the Moran Tea Co., Cachar, states attacks and destroys the young Pekoe shoots, is the same species of beetle named *Diapromorpha melanopus*, that caused so much damage on the Cossipore Tea Estate in 1869, as noticed in the Society's Proceedings for November of that year. 'The only remedy that is at all likely to prove successful is that of having the tea plants carefully and regularly looked over several times during the day, and all insects found upon the plants picked off and instantly killed by pressing them between the fingers. This operation should form a part of the regular daily work of the hands on the plantation. With reference to another kind of tea *blight*, namely, that which is stated to be now common in Cachar, and causing the shoots and old leaves to become brown blistered and shrivelled up, is caused by the punctures of small bugs. These leaves and shoots should also be picked off and burnt immediately they are found so attacked, otherwise they

become mouldy, and this parasitic fungus then spreads itself rapidly over the plants, which very soon afterwards die. Some of these leaves have recently been examined by Mr. M. C. Cooke, and the mould found to be a new species which has been described in the December number of "Grevilla" under the name of *Hendersonia theaeicola*."

Ordered that a copy be sent to Messrs. Lyall, Rennie, and Co., Agents of the Moran Tea Co.

Read letter from Mr. R. Blechynden, Officiating Secretary, Bengal Tea Co., forwarding specimens of a blight insect which had been infesting the gardens of that Company.

The Officiating Secretary reported he had forwarded these specimens on to the Curator of the Asiatic Society, Mr. Wood-Mason, and requested him to say if they were identical with the insects sent to him for identification in October and December last.

Read the following letter from Dr. C. J. Simons, of Assam, accompanying some branches of chestnut and tea bushes infested with the thread blight:

"Accompanying are the specimens of the "Thread Blight" I was speaking to you of. It appears to me to be a lichen, rather than a fungus which planters suppose it to be. When it spreads among the plants in a garden, it materially affects the yield of them, and it would be worth knowing if there is any means of preventing it."

The Offg. Secretary said that this appears the same blight as that once casually produced at one of the Society's Meetings. It is proposed to send the specimen to the Secretary of the Society now at home, with the hope of obtaining some information respecting it.

#### REDUCTION IN RAILWAY FREIGHT ON PLANTS AND SHRUBS.

Received from the Secretary to the Government of Bengal copy of the following "Resolution," from the Proceedings of the Government of India, in the Department of Agriculture, Revenue, and Commerce, dated Calcutta, the 10th February, 1873.

"It having been brought to notice that the distribution of plants and shrubs from the several Botanical Gardens was restricted by the high rate of freight

Eastern Bengal Railway.

East India Railway

Sind, Punjab, and Delhi Railway.

Madras Railway.

(4th class) charged for their conveyance by rail-

way, the possibility of lowering the rate was

suggested to the various Companies. The

Governor General in Council is now glad to observe that the Companies noted on the margin have agreed to reduce the rate to the 2nd class, and the Great Southern of India Railway Company even to the first class; all consignments being carried at the owner's risk.

"2. The Great Indian Peninsula Railway Company has agreed to carry plants

and shrubs on the payment of—

"(1). A minimum charge at second class rate, as for three tons per truck, used at owner's risk; or

"(2). Third class rate on actual weight, also at owner's risk; or

"(3). Fourth class rate on actual weight, at the Company's risk.

"3. The Oudh and Rohilkhand Railway Company is prepared to adopt the same terms as have been accepted by the authorities of the other railways with which that Company books through."

#### REPAIRS TO THE METCALFE HALL.

Read letter as follows, from Messrs. Burn and Co :

"We have received your memorandum of this date, and regret that it will be impossible to furnish you with a full report, as to what we think it will be necessary to do to secure the entablature over the unsound architraves of the Metcalfe Hall, before next week; we may state, however, that at least 75 per cent. of the wood is quite decayed and must be removed, fortunately the corner architraves are the soundest, and this makes the building safer than it otherwise would be; in fact were it not for that fortunate circumstance, the building would be in a highly dangerous condition."

"We forward per bearer a specimen of the decayed timber taken from one of the architraves which will shew you that they are utterly worthless as supports to the heavy masonry above them. Judging from the appearance of several samples, we are of opinion that the timbers have been attacked with dry-rot and subsequently by white-ant."

Referred to the House Committee.

#### FLOWER SHOW.

Resolved that the question of a second Flower Show to be held in March, be referred to the Council, with the request that they will decide thereon early in next month.

#### COMMUNICATIONS ON VARIOUS SUBJECTS.

Read letter from Messrs. Wheeler Brothers, of Julna, near Almorah, Kumaon, asking for any analysis that may have been made of the roots, leaves, and branches of the Tea plant, and of various fruits. To reply, the Society have no such analysis on record.

"Also letter from Mr. S. E. Peal of Sapakati, Sibsagar, Assam, asking for seeds of teak and other valuable timber trees for planting in his locality, and suggesting that the Society might possibly be the medium through which members in one part of India could exchange seeds from another part.

The Officiating Secretary stated that he had complied with the request for seeds as far as possible.

The best thanks of the Society were accorded for the above presentations and communications.

**EXHIBITION OF PLANTS.**

Mr. A. Rogers exhibited three plants of Hyacinth, growing and flowering, one in water, for which seven marks were awarded.

Mr. C. E. Price exhibited a plant of Anæctochilis, a Ceylon orchid, for which four marks were awarded.

Mr. T. M. Francis exhibited two young seedlings of *Primula Elatior* (*Polyanthus*), raised from seeds sown in November last.

*Thursday, the 27th March, 1873.*

J. A. CRAWFORD, ESQ., *President in the Chair.*

The Proceedings of the last meeting were read and confirmed.

The following gentlemen were elected ordinary members :

Mr. R. G. Watling, Dr. John Cardy Shaw, Captain H. P. Nash, Mr. H. Firth, Baboo Bhoojender Bhoomun Chatterjee, and Captain A. R. Wilkinson.

The names of the following gentlemen were submitted as candidates for election :

N. Vertue, Esq., Cantonment Magistrate, Jubbulpore,—proposed by the President, seconded by Mr. S. H. Robinson.

Dr. J. C. Whishaw, M. D., Superintendent, Central Jail, Lucknow,—proposed by Captain W. E. Forbes, seconded by Dr. C. Fabre Tonnerre.

G. B. Macnochie, Esq., Offg. Deputy Commissioner, Gonda, Oude,—proposed by Captain W. E. Forbes, seconded by the President.

Rajah Notobur Sing, Thudraj Brâmobur Rai, of Killoh, Khandpadda,—proposed by Mr. T. E. Ravenshaw, seconded by the President.

Captain W. J. P. Barlow, Commanding 5th N. I., Meerut,—proposed by Dr. R. H. Perkins, seconded by Captain H. J. Senior.

Maharajah Sir Drighije Singh, K. O. S. I., Bulrampore, Oude,—proposed by Captain W. E. Forbes, seconded by Baboo Peary Chand Mittra.

T. Determes, Esq., Merchant, Chittagong,—proposed by Mr. J. P. Langlois, seconded by Baboo Peary Chand Mittra.

S. H. C. Tayler, Esq., Judge of Beerbhoom,—proposed by Dr. R. A. Barker, seconded by Mr. W. R. Larmine.

L. R. Tottenham, Esq., Civil Service, Beerbhoom,—proposed by the President, seconded by Mr. W. Stalkart.

Rejoined—Captain W. E. Forbes, Settlement Officer, Gonda, Oude. Agreed to.

The following contributions were announced.

Report on the Administration of the Forest Department for 1871-72, from Government of India, Department of Agriculture, Revenue, and Commerce.

Report of the Commissioner of Agriculture on the diseases of Cattle in the United States, from the Government of the United States of America.

Report of the Board of Regents of the Smithsonian Institution, from the Institution.

Reports of the Department of Agriculture of the United States of America, for 1870-71,—from the Government of the United States of America.

#### HORTICULTURAL AND FLORICULTURAL SHOW.

The Council submitted the report of the judges on the Show held at the Town Hall, on Wednesday, the 19th February last, at 11 A. M., as follows :

#### HORTICULTURAL.

The show of vegetables was a very fair one, considering that it was rather late in the season for many of the European kinds.

2. For a description of the European vegetables exhibited, the judges cannot do better than adopt the following remarks which appeared in the *Englishman*, on the 20th February :

3. "The Brassica tribe was most abundantly represented, and very well grown, Brussels sprouts appearing for the first time, for many years. Of Scotch Kale, a very good collection was shown, and many specimens of the Sugar Loaf and Savoy Cabbage were remarkably fine. The Cauliflower was splendid, considering the lateness of the season, and the Brocoli was also very fair. Mention should also be made of some immense heads of red pickling cabbage. The Globe Artichoke was very good indeed, and of Tomatoes, we can only say that they were as fine as any we have ever seen in Europe. The very best specimen was exhibited by a native ryot and grown without the assistance of European supervision, and shows what natives can do when they like."

4. "Carrots of every description were well represented, but the palm for quality and sweetness must be awarded to the long and short horn varieties. The Celery was so remarkable that the judges had the greatest difficulty in deciding whose collection was the best. A bronze medal was awarded for some splendid heads. The Lettuces and Onions were well grown; and of the Peas some of the best European varieties were exhibited; both Victoria and Marrowfat were worthy of special mention. For size and quantity, the Windsor Beans were remarkable. Beet, very fine and abundant, particularly the blood-red, and we noticed some capital specimens of Mangel Wurzel. Owing to the dryness of the season, the Knol-Khol and Turnips were very different."

5. Altogether 59 prizes were awarded to 32 gardens, nearly all owned by native malces; to two private gardens only three prizes were awarded, besides

four to the Presidency Jail Garden, which sent in a fine collection of Cabbage, Beet, Carrots, &c.

6. There were some good collections of native vegetables, especially of Brinjals, from the gardens of Rajah Suttia Nundo Ghosal and the Presidency Jail.

7. There was but a small show of native fruits, to which seven prizes only, of Rs. 23 in all, were awarded.

8. The prize lists are appended.

C. FABRE TONNERRE,  
ARCHID. ROGERS.

#### FLORICULTURAL.

In the Floricultural Department, there was a small collection of both Annuals and Perennials without any thing of very remarkable excellence.

2. The Public Gardens, namely, Eden Garden and Dalhousie Square, contributed the largest collections, both of varieties and specimens, the former carrying off nine and the latter six prizes, out of the total number of 45 awarded. The contributions from the Eden Garden of Phlox, Pinks, Portulaca, and Antirrhinum were amongst the best exhibited, and obtained prizes. To the Dalhousie Square Garden, were awarded the first prize for Palm, and others for Petunia, Geraniums, and Pinks.

3. Mr. C. E. Price obtained the first prize for Portulacas and several others for Ferns, Begonias, and some good specimens of Pothos Argyræa, Anacardium, and Eucharis Amazonica.

4. There were some good specimens of cut roses, for which Messrs. Doucett, A. H. Mowbray, and G. W. Bartlett obtained prizes.

5. About a dozen other Gardens exhibited some small collections in which the Heartsease was fairly represented from the gardens of Messrs. Doucett and Francis. A special prize was awarded to Mr. Apcar for a good show of Arbutus.

6. Among the novelties were some good specimens of Amaranthus Salicifolius from three gardens, also a new variety of Croton, and one of Dracæna exhibited by Rajah Suttia Nundo Ghosal, Bahadoor, for all of which prizes were awarded.

7. The total awarded for the 45 prizes was Rs. 164, as per list annexed.

8. Besides the above, there was a fine collection of plants from Dr. Henderson, Officiating Superintendent of the Royal Botanical Garden, comprizing two fine Angstræa Superba, in flower, a Madagascar Orchid, the deliciously-scented Saccobium Giganteum, a pretty Cyrtopodium, and Calagyna, besides Begonias and Ferns.

S. JENNINGS.

A. H. MOWBRAY.

G. W. BARTLETT.

*Prizes obtained at the Flower Show on the 19th February, 1873, by two public Gardens and 13 private Gardens, as under :*

1. Eden Garden obtained for Coleas, Verbenas, Phlox, Begonia, Amaranthus Silenaceæ, Portulaca, and Autirrhinum	9 prizes	...	Rs. 30 0 0
2. Dalhousie Square obtained for Palms, Geraniums, Tropæolum, Ambronia Umbellata, Petunia, and Silenaceæ	6 prizes	...	" 21 0 0
3. Mr. C. E. Price obtained for Pothos Argyroea, Anæcto chilus, Eucharis Amazonica, Ferns, Portulaca, and Begonia	6 prizes	...	" 22 0 0
4. Mr. Apar, Allipore, obtained for Ferns, Araucaria, Eupherbia Jacquiniiflora, Campanula and Begonia	5 prizes	...	" 19 0 0
5. Mr. G. W. Bartlett obtained for Verbenas, Phlox, cut Roses, &c.	5 prizes	...	" 24 0 0
6. Mr. A. H. Mowbray obtained for cut Roses and Violet	2 prizes	..	" 5 0 0
7. Seven Tank Garden obtained for cut Roses and Cactæ	2 prizes	...	" 7 0 0
8. Raja Suttia Nundo Ghosal obtained for new specimens of Croton, Maxima, and Dra-cæna	2 prizes	...	" 9 0 0
9. Mr. Donceat obtained for cut Roses and Heartsease	2 prizes	...	" 7 0 0
10. Capt. Laurell, Alipore, for best collection of Camellias	1 prize	..	" 8 0 0
11. Mr. J. N. T. Wood, Alipore, for best specimens of Aster	1 prize	...	" 2 0 0
12. Mr. T. M. Francis for best collection of Heartsease	1 prize	...	" 4 0 0
13. Mr. H. Wood, for Begonia	1 prize	...	" 2 0 0
14. Baboo Ram Chunder Seal for Autirrhinum	1 prize	..	" 3 0 0
15. Belgachia, Garden, for Silenaceæ	1 prize	...	" 1 0 0

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Total No. of prizes 45 Total Rs. 164 0 0

Of which 15 were awarded to two public gardens.

The Officiating Secretary reported that the Council had recommended that no further Flower Show be held this season, in consequence of the impending outlay required for the laying out of the new Garden and repairs to the Metcalfe Hall.

#### SUNDRY COMMUNICATIONS.

Read letter from the Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, asking for an assortment of fresh imported American Tobacco seeds to meet a requisition for the same, from the Assis-

tant Secretary to the Chief Commissioner of British Burmah. The Officiating Secretary reported that this was duly complied with immediately on receipt.

Read letter from Messrs. Jas. Carter and Co., of London, advising shipment of 20 cwt. of two varieties of seed Potatoes, very red-skinned Flour Ball and ash-leaf kidney, per *S. S. Hidalgo*. The Officiating Secretary reported that the vessel has arrived in port; that the potatoes are being landed, and will be ready for delivery to applicants early next week.

#### TEA BLIGHT.

Read letter from W. H. Cogswell, Esq., enclosing copy of one to his address, from Mr. E. L. Edgar, of the Cossipore Tea Garden, Cachar, relative to a very destructive grub of the borer species, causing much damage and loss to Tea bushes. Mr. Edgar is not aware if this description of grub has been observed before by other Tea planters as destructive to Tea bushes, and sends a specimen of the grub and stalks which have been bored.

Ordered, that these specimens be sent home to the Secretary, in England, for identification.

#### SANSIVIERA FIBRE.

Read letter from Lord Ulrick Browne, enclosing copy of one from the Deputy Collector, Statistical Department, Jessore, with specimen of a fibre and leaf of the plant which yields the same, known at Jessore by the name of Sooch Mookhee, and desiring to know if the fibre would be useful as a substitute for jute or for making paper. The Officiating Secretary reported that the fibre and the plant is identical with Moorva or Sansiviera, a Liliaceous plant, the fibre according to Royle and Roxburgh, is used by natives for making bow strings and fishing lines, and equal in strength to the Agave fibre.

Read the following report on it by Mr. J. H. Hutchinson, member of the Fibre Committee.

"The fibre would answer well for paper making, and if 50 to 100 maunds are sent down to Calcutta, a trial could be made, and the value ascertained.

"Probable value in Calcutta, Rs. 3 per Bazar maund." Copy of this, and of the description of it in Roxburgh's *Flora Indica*, to be sent to Baboo Ram Shunker Sen, the Deputy Collector, Statistical Department, Jessore.

#### CAROLINA PADDY.

Dr. Fabre Tonnerre verbally placed at the disposal of the Society (50) fifty maunds of Carolina paddy.

The Meeting thanked Dr. Tonnerre for his offer.

The thanks of the Society were accorded for the above presentations and communications.



## EXHIBITION OF PLANTS.

Mr. T. M. Francis exhibited two pots, showing the reproduction of plant from leaf propagation, viz., the *Episcia Pulchella* and the *Peperonia*, the latter shewing twelve young plants springing from two leaves, which Mr. Francis says were pegged down about nine weeks ago.

Mr. C. E. Price exhibited a plant of *Caladium Meyerbeer* and one of *Saccolabium Guttatum*. A prize of two marks was awarded for the former.

Mr. A. Stfand exhibited a fine specimen of a double variegated *Petunia*, in size and form rarely to be seen in Bengal.

*Thursday, the 24th April, 1873.*

J. A. CRAWFORD, Esq., *President in the Chair.*

The Proceedings of the last meeting were read and confirmed.

The following gentlemen were elected ordinary members :

Captain N. Vertue, Dr. J. C. Whishaw, Mr. G. B. Macnochie, Rajah Notobur Sing Thundraj Brounbur Rai, Captain W. J. P. Barlow, Maharajah Sir Drigbige Singh, K. C. S. I., Messrs. T. Determes, S. H. C. Tayler, and R. L. Tottenham, C. S.

The names of the following gentlemen were submitted as candidates for election :

1. C. E. Jackson, Esq., Manager, New Mutual Tea Co., Lallmookh Hylakandy, Cachar,—proposed by Mr. Geo. Grace, seconded by Mr. S. H. Robinson.

2. R. Fraser, Esq., Opium Factory, Patna,—proposed by Mr. W. H. Jones, seconded by Mr. S. H. Robinson.

3. Principal Rajkumar College, Rajkote, Kattywar,—proposed by Mr. Chester Macnaghten, seconded by Mr. W. Pigott.

4. C. G. Palmer, Esq., Assistant Engineer, Ganges Canal, Cawnpore,—proposed by Dr. W. Jameson, seconded by the President.

5. T. T. Bond, Esq., Government Engineer, Steam Mills, Cawnpore,—proposed by Dr. W. Jameson, seconded by the President.

6. Lieut.-Col. J. S. Rawlins, Commanding 1st Goorkha L. I., Dhurmsala,—proposed by Colonel C. Drury, seconded by the President.

7. Dr. R. M. Milne, Superintendent of Jail, Futtehghurh,—proposed by Captain H. R. Wintle, seconded by Mr. S. H. Robinson.

8. The Thakore Sahib, Rajkote,—proposed by Mr. Chester Macnaghten, seconded by Baboo Peary Chand Mittra.

9. H. W. Woollen, Esq., Assistant Indigo Planter, Bulleah, Sahabad,—proposed by Mr. W. B. Chardon, seconded by Rajah Suttysanunda Ghosal, Bahadoor.

10. B. T. Greetham, Esq., Clerk of Works, S. P. and D. Railway, Saharanpore,—proposed by Mr. J. Hurst, seconded by Mr. S. H. Robinson.

11. H. H. Davis, Esq., Assistant Conservator of Forests, Chittagong,—proposed by Mr. R. Macalpine, seconded by Mr. S. H. Robinson.

Rejoined.—Robert Stewart, Esq., Merchant, Calcutta. Agreed to.

The following contributions were announced :

The Flora Sylviatica for Southern India, Part XXV.,—from the Government of India.

Records of the Geological Survey of India, Vol. VI., Part I.,—from the Superintendent.

Proceedings of the Asiatic Society of Bengal, No. II., February 1873,—from the Society.

Annals of Indian Administration for 1870-71, Part II.; Vol. XV., and Parts I. and II., Vol. XVI.,—from the Government of Bengal.

Proceedings of the Agricultural and Horticultural Society of Madras, for March, July, August, September, October, and November, 1872, and January, 1873,—from the Society.

A pamphlet entitled "The Indian Wheat,"—from Baboo Peary Chande Mittra.

Seeds of Mahogany tree,—from W. H. Cogswell, Esq.

Seeds of Putrangivi Ruxburghii,—from R. Nicholson, Esq.

Seeds of a very large description of Peinjull,—from Dr. J. C. Mackenzie.

Seeds of Capsicum grown from imported stock,—from Dr. S. C. Mackenzie.

Capsicum seeds,—from Dr. Sydney Lynch.

#### GUM OF THE "COORTAH" TREE OF CAOCHIN.

Read letter from Mr. A. H. Blechynden, the Secretary now in England, forwarding report as follows, from Dr. T. Forbes Watson, on the sample of the gum of the Coortah tree, to which allusion was made in the Monthly Proceedings of the Society held on the 24th of June, 1870, and suggesting that application be made to the Department of Agriculture, Revenue, and Commerce, for the collection of a larger quantity of the gum.

"The samples of "Coorta" Gutta, forwarded to the India Museum for report on quality and applicability for purposes for which Gutta Percha and Caoutchouc are employed, were submitted to "The India Rubber, Gutta Percha, and Telegraph Works Company," "The Gutta Percha Company," "The Compound Gutta Percha Company," Messrs. Smith and Co., and Mr. G. P. Dodge, a well known Gutta merchant."

The report of the India Rubber Company was to the following effect :

"We find the substance is unlike Gutta Percha in several respects. When it is softened it remains a long time in a soft, sticky, and plastic condition, and when it is dry and hard, it is brittle. We fear it cannot be applied as a substitute for Gutta Percha, or if so, the application must be very limited. Possibly new uses might be found for the substance if it is abundant and cheap."

"The "Gutta Percha Company" reported: "That the sample sent is of no value to them, and they do not know any purpose for which the material can be made available."

Mr. Dodge thinks it is worth very little, but states that "it cannot be tried as to exact value unless a quantity of 56 lbs. at the least is worked up."

"This substance, if not identical with, is closely allied to the Gutta which, under the name of "Panthontee" was examined and tested some years since, with no very favourable results. Like the tree yielding the Panthontee gum, that which affords the Coortah Gum belongs to the natural order *Sapotacea*, and probably also to the same genus *Bassa*; it may belong to the same species"

"It will be seen that the reports are unfavourable, but it seems to me that the substance is worthy of a more extended examination, than could possibly have been done with the small quantities forwarded. I would therefore suggest that the Society should arrange to obtain and forward to me about 56 lbs. weight of it; if such a quantity cannot be procured, I will try to do the best with whatever can be forthcoming."

The Meeting adopted the recommendation of Mr. Blechynden, to apply to the Department of Agriculture, Revenue, and Commerce, for assistance in procuring 56 lbs. of the gum.

#### CONCENTRATED TEA FERTILIZER.

Read letter from Mr. A. H. Blechynden, the Secretary, now in London, enclosing correspondence with Dr Geo. King, Dr Campbell Brown, and Messrs. Samuell and Son, regarding the concentrated manure for fertilizing the Tea plant, to which reference was made in the Proceedings of the Society held on the 27th June and 25th July last. From the following extracts it will be seen that Dr. Brown and Messrs. Samuell and Son are anxious to know the result of the experimental uses of the fertilizer

Dr. J. Campbell Brown writes, "the manure made by my directions ought to grow crops well if rightly used. If you can make any suggestions, or ask any questions, or propound difficulties, I shall do my best to give all information which my experience suggests," and he adds, "I should like the details of the results, &c., to be sent to me, as I might modify or alter the manure if it seem desirable."

Messrs. Samuell and Son write: "The tea grower should notice especially the quality of the different growths as well as the quantity: We cannot conceive that the fertilizer should be a failure as high prices are paid in England for manures for crops of inferior value. The results of the points to be noted are, quickness of growth, quantity of leaf and quality of the Teas, as a success or failure in any of these points might greatly modify both the make and price of

the fertilizer. We shall be glad of any hints you might give us on points for our consideration, as we are desirous, whatever may be the result, of making the experiment a complete one."

The Officiating Secretary reported, that all the recipients have been specially addressed on the subject of returning reports of the experimental trial of the fertilizer, without a single response as yet.

SUN FLOWER OIL.

Read letter from the Officiating Secretary to the Chief Commissioner of Mysore, forwarding copies of statements in regard to the experimental cultivation of the Sun Flower for purposes of expressing oil from the seed, and to which reference was made in the Monthly Proceedings of the Society held on the 25th July last. *Vide* tabular Statement shewing the results of the experimental cultivation.





*cultivation of Sunflower and expression of Oil from seed.*

DATE OF	COST OF		RETURNS.						RESULT.		REMARKS.	
	Harvesting.	Cultivation.	Pressing Oil	Total Cost.	Quantity of Seed.	Yield of Oil therefrom.	Rate of Oil per Qrt.	Amount.	Refuse as fuel.	Total Returns.		Profit.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	lbs. qts							
20th Jan., 1873.	23 0	1 10 0	0 0 33	0 1 324	45 12 A	33 12 0	2 0 0	3 12 0	0 3 12	0 2 11	11 0 0	0 0 0
13th Dec., 1872.	15 8 6	6 0 21	8 6 125	17 12 A	13 2 0	2 0 0	0 15 2	0 0 0	0 6 6	0 0 0	0 6 6	0 0 0
10th Jan., 1873.	6 6 0	2 0 0	8 6 0	40 5 12 A	4 2 0	2 0 0	6 2 2	0 0 2	0 4 0	0 0 0	0 4 0	0 0 0
20th Jan., 1873.	8 0 0	0 0 0	0 0 0	78 0 0	0 0 0	0 0 0	8 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
The oil from the seeds has not yet been expressed.												

The oil from the seeds has not yet been expressed.

**JAPAN SILK WORMS.**

Read letter, as follows, from Mr. G. DeCristoforis, dated Milan, 6th March, 1873, 14, via Monforte.

"I beg to inform you, that I have been appointed by the Agricultural Society of Lombardy, as their Agent, for the purchase of the silk worm eggs in Japan, for the next season of 1874. I shall leave this for Yokohama *"via Suez,"* on the 15th of June next, and leave Yokohama, on my way home with the cards, by the end of October.

"My object in giving you this information is to make you the offer of my services in the event that you may think useful to give me any orders for purchasing cards for the purpose of being reared in Bengal by some of the principal rearers, or by the European silk manufacturers, as this would be a good opportunity to obtain really warranted *annual* silk worm eggs from the best accredited silk province of Japan, which on my way home I would leave at Point de Galle to be forwarded to you, if no other more direct means of conveyance is to be found. Your reply may find me here till the end of May next, otherwise my address in Yokohama is care of Messrs. Farfara and Grenet; and in the event that you should favor me with an order, you will at the same time supply me with the necessary funds; it being superfluous to add that I shall take every possible care to supply you with the best cards, and to have them carefully packed."

The Officiating Secretary reminded the Meeting that a valuable paper on the subject of Silk Worm rearing by Mr. DeCristoforis appeared in the Monthly Proceedings of the Society held on the 19th September last.

**MAHOGANY SEED.**

Read letter, as follows, from Mr. W. H. Cogswell, with a few seeds of the Mahogany tree :

"I called at your Office last month, and read the proceedings of the Meeting of 27th February, and referring to that minute, re-Mahogany seed, I had a thorough good search made in the branches of sixteen trees, which stand in my garden at Tittagbur. It resulted in finding one cone only, full of seed, which ripened, and fell a few days ago. I send you about 8 dozen seeds for distribution, and the cone which will enable you to see how the seed has grown in layers upon the base thereof; and my sirdar Mally, who has known these trees for 20 years, says, this is the third time only he has known the seeds to show; and Mr. Errington, of the Park at Barrackpore, says, that his Mullies have never known the trees in the Park to seed. I consider that they do seed more frequently than is known, but that the seed is so light and fragile, it is blown away at the commencement of the South-West monsoon. I have sent you all I can spare."



## JOURNALS AND OTHER PUBLICATIONS OF THE SOCIETY.

Read letter of application from Dr. Geo. Henderson, Officiating Supdt., Royal Botanical Garden, asking to be furnished with complete sets of the Society's Journals, &c, for the use of the Garden Library. Ordered to be complied with as far as copies are available.

## JAPAN PEAS.

Read letter from Revd. J. Phillips, Jellalore, inquiring if the Japan Peas, referred to in an American paper, of which the following is an extract, have been introduced in India.

The *Mobile Register* says: "We claim the honor of having started this new interest in the Japan peas, and we are really proud of it, for the Japan pea is undoubtedly one of the best things climatically secured to the South. It is easily raised, will grow on almost any character of soil, yields enormously, and is entirely exempt from attack by either the pea or bean weevil. As a food for man, we think it has no equal in the pea or bean line, and it makes a stock feed almost equal to corn. Hogs relish it, and fatten upon it, and poultry of all kinds seem to want nothing better. Sown thickly upon the land, it makes the very best of hay, and as a green feed, stock will eat it in preference to anything else."

The Society are not aware of this variety having been introduced into India.

## SEED PADDY.

Read letters from S. E. Peal, Esq., of Seebaugar Assam, J. W. Quintin, Esq., of Hurdul, Oude, and Revd. J. Phillips, of Jellalore, soliciting information for the introduction in their several localities of a better and improved variety of paddy, particularly of kinds which will yield a large grain rice, paddy having strong stems or stalks, such as will survive heavy rain, wind, and inundation.

Referred to the Grain Committee for report.

## WORK ON GARDENING.

Read letter from Lieut.-Col. T. M. Shelley, forwarding MS. of a work on gardening, for the acceptance of the Society.

Referred to the Committee of Papers as a suitable Essay for publication in the journal.

## TEA BLIGHT.

Mr. James Wood-Mason, Assistant Curator of the Asiatic Society of Bengal, referred to the species of Tea Blight insects sent to him for identification, more especially that sent to him from the gardens of the Bengal Tea Co., Cachar, referred to in the Proceedings of the 27th February last, which he said

appeared to be identical with the bug species sent to him last year by Mr. E. E. Peal, of Assam, with whom he had been in further communication on the subject, and had received from him a valuable paper, with coloured illustrations, which he, Mr. Wood-Mason proposed forwarding to the Society with a few notes of his own.

The best thanks of the Society were awarded for the above presentations and communications.

EXHIBITION OF PLANTS.

Mr. W. Pigott exhibited four fine specimens of new Caladin, for two of which, viz. "*Max Kolb*" and "*Reine Victoria*," five marks to each were awarded by the judges.

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*Thursday, the 29th May, 1878.*

J. A. CRAWFORD, ESQ., *President in the Chair.*

The proceedings of the last meeting were read and confirmed.

The following gentlemen were elected ordinary members.

Messrs. C. E. Jackson, R. Fraser, C. G. Palmer, T. T. Bond, H. W. Woollen, R. T. Greatham, H. H. Davis, Principal, Rajkumar College, Rajkot, Lieut.-Col. J. S. Rawlinson, Dr. R. M. Milne, and the Thakore Sahib, Rajkote.

The names of the following gentlemen were submitted as candidates for election:

1. Baboo Banee Madhub Roy Chowdry, Zemindar, Allahabad,—proposed by Baboo Peary Mohun Banerjee, seconded by Mr. S. H. Robinson.

2. Revd. W. Wilkinson, Arrah, Shahabad,—proposed by Mr. W. B. Chardon, seconded by Mr. H. W. Woollen.

3. W. Barnfather, Esq., Ex.-Engineer, Bhaugulpore,—proposed by Mr. V. T. Taylor, seconded by Dr. N. B. Baillie.

4. H. LePoer Wynne, Esq., Civil Service, Cashmere,—proposed by the President, seconded by Mr. W. Stalkartt.

5. Walter H. Bennett, Esq., Superintendent, New Tazepore Tea Concern, Assam,—proposed by Mr. Geo. Grace, seconded by Mr. W. Stalkartt.

6. A. Inthurn, Esq., M. D., Civil Surgeon, Durrung,—proposed by Mr. Grace, seconded by Mr. S. H. Robinson.

7. Phillip Nolan, Esq., C. S., Magistrate, Serajgunge,—proposed by Mr. W. Stalkartt, seconded by Mr. A. W. Murdoch.

8. Colonel Dhaj Nursing Bahadoor, Nepaul,—proposed by Dr. D. Wright, seconded by the President.

9. Albert E. Heath, Esq., Assistant Commissioner, Maler Kotlah, near Ludiana,—proposed by Mr. W. A. Robinson, seconded by Dr. Tonnerre.

10. E. G. Foley, Esq., Tulanugger Tea Factory, Sylhet,—proposed by Mr. C. B. Jennings, seconded by Mr. W. Stalkartt.

11. Major R. Home, Superintending Engineer, Umballa Cantonment, Umballa,—proposed by Mr. S. H. Robinson, seconded by the President.

12. Captain A. Y. Phillips, Political Assistant in charge, Gonda, Kattywar,—proposed by Mr. Chester Macnaghten, seconded by Mr. S. H. Robinson.

13. Colonel G. Fagan, Bombay Infantry, Sattara,—proposed by Mr. A. Bonanquet, seconded by the President. The following contributions were announced.

Obituary Notice of Dr. Robt. Wight, F. R. S., by Dr. H. Cleghorn. Presented by the author.

Report of the Bombay Chamber of Commerce, for 1871-72, from the Chamber.

Transactions of the Bengal Social Science Association, Vol. VI., from the Association.

The Flora Sylvatica for Southern India, Parts XXV. and XXVI., from the Government of India.

Report of the Sanitary Committee of Bengal, for the year 1871, with Appendix, from the Government of Bengal.

Records of the Geological Survey of India, Vol. VI., Part II, for 1873, from the Superintendent.

Memoirs of the Geological Survey of India, Vol. X., Part I.

Memoirs of the Palaeontologia Indica, Vol. IV, Parts III. and IV.

Report of the Agricultural Society of Pnnjaub, of meetings held on the 13th February, 1871, 10th April, and 22nd June, 1872.

Proceedings of Meetings of Agricultural and Horticultural Society of Madras, held on the 3rd April, 1st May, and 5th June, 1872, 5th February, 5th March, 31st March, and 2nd April, 1873.

Report of the Annual Exhibition held at Madras, on the 27th February, 1873.

Journal of the Asiatic Society of Bengal, Part II, Nos. I. and II.

An assortment of Seeds of trees, shrubs, plants, and creepers, from Barrack-pore Park.

A few packets of seeds from New Zealand. Presented by John Thomson, Esq., Calcutta.

A quantity of seeds of the Teak tree from Dr. Baker.

Seeds of the Wygandia Vigiera, from A. Rogers, Esq.

Seeds of Balsam and white candytuft, from J. S. Armstrong, Esq.

#### CAROLINA PADDY.

Read letter as follows from Dr. C. Fabre-Tonnerre, in reply to the Officiating Secretary's application for the seed paddy which was offered by that gentleman and referred to in the Proceedings of the 27th March last.

"With reference to your letter of this date, the undersigned begs to intimate that, owing to unforeseen circumstances, his offer of the Paddy alluded to is withdrawn."—CHARLES FABER-TONNERRE.

VEGETABLE AND FLOWER SEEDS.

Read letter from Messrs. D. Landreth and Son, Philadelphia, announcing the Society's annual order for seeds being shipped from Liverpool on the "City of Oxford," which left at the end of April, and may now shortly be expected to arrive in Calcutta.

Read letter from Messrs. Vilmorin, Andrieux, & Co., Paris, advising having shipped a portion of the Society's annual order to meet the requirements of members who have signified their wish to have seeds early in the season, and that the bulk of the order which was ready packed, would follow without delay.

TEA BLIGHT.

Read letter from Mr. G. F. Pinney, Rungajam, Assam, forwarding a box of insects or worms, in different stages, found on the Tea bushes. These insects, says Mr. Pinney, appear to nibble the young shoots for the purpose of making houses for themselves.

The Officiating Secretary reported that the box of insects, immediately on receipt was made over to Mr. James Wood-Mason, with request for him kindly to identify and report on the species.

GRAFTING OR INARCHING.

Read letter from Mr. C. Nickels, of Jounpore, wishing to know if it be possible to graft the *Magnolia Grandiflora* upon the *Michilia Champaca*. Agreed to refer the question to Mr. John Scott, Curator, Royal Botanical Garden.

N. B.—Mr. Scott is of opinion that the character of the wood of the 2 varieties is so widely dissimilar, that they will never unite in grafting.

VIRGINIA TOBACCO.

Read letter from Lord H. Ulick Brown, Commissioner, Presidency Division, forwarding for opinion and report specimens of Tobacco leaf grown in the District of Jessore from acclimatized Virginia seed.

Referred to the Tobacco Committee.

The best thanks of the Society were awarded for the above presentations and communications.

NEW VARIETIES OF SUGAR-CANE.

Read letter from Mr. John Horn, Sub-Director, Royal Botanical Garden, Mauritius, asking for seeds of Timber trees, and enclosing a list of desiderata, suggesting that in cases where seeds are not likely to preserve their vitality

long enough to germinate after the voyage to the Mauritius, that such seeds be sown in warden cases, which cases will be returned with plants and cuttings of many new and choice varieties of sugar-cane recently introduced, of kinds superior to any that have hitherto been cultivated at the Mauritius.

Agreed to comply with this requisition. The question of reciprocating in sugar-cane cuttings, to be referred to the Council.

#### EXHIBITION OF PLANTS, &c.

Mr. C. E. Price exhibited four new Caladia, recently imported by himself, viz., the C. Anher, C. Beethoven, C. Cancaertii, and C. Meyerbeer.

Baboo Pary Chaud Mitta exhibited, as a curiosity, pumpkins growing in clusters.

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*Thursday, the 26th June, 1873.*

W. STALKARTT, Esq., *Vice-President in the Chair.*

Mr Crawford, the President, was absent owing to indisposition.

The proceedings of the last meeting were read and confirmed.

The following gentlemen were elected ordinary members :

Baboo Bance Madhub Roy Chowdry, Revd. W. Wilkinson, Messrs W. Barnfather, H. LePoer Wynne, W. H. Bennett, Dr. A. Inthurn, Mr. Philip Nolan, c. s., Colonel Dhaj Nursing, Bahadoor, Mr. A. E. Heath, Mr. E. G. Foley, Major R. Home, Captain A. Y. Phillips, and Colonel G. Fagan

The names of the following gentlemen were submitted as candidates for election :

The Secretary, Government Botanical Garden, Monghyr,—proposed by Mr. W. Stalkartt, seconded by Dr. Tonnerre.

The Secretary, Local Fund, Ninar, Khundwa,—proposed by Dr. Tonnerre, seconded by Mr. S. H. Robinson.

W. Shipp, Esq., c. s., G. I. P. Railway, Huda,—proposed by Mr. H. Leeds, and seconded by Mr. W. Stalkartt.

The Honorary Secretary, Nynce Tal Club, Nynce Tal,—proposed by Major General J. T. Shakespeare and seconded by Mr. J. M. Wood.

A. B. Inglis, Esq., Merchant, Calcutta,—proposed by Mr. H. H. Sutherland, and seconded by Mr. Robinson.

E. A. DeSilva, Esq., Assistant Dispensing Chemist, Calcutta,—proposed by Dr. A. R. Ferris and seconded by Mr. S. H. Robinson.

Mr. Dalgliesh, Esq., Indigo Planter, Dulsiag Serai, Tipoot,—proposed by Mr. S. H. Robinson, seconded by Mr. J. W. Wood.

Mr. S. J. Leslie, Solicitor, Calcutta, intimated his desire to join, — agreed to.  
The following contributions were announced:

*Flora Sylatica of Southern India*, Part XXVI., from the Government of India.

Report of the Bengal Chamber of Commerce, from the Chamber.

• The Madras Experimental and Model Farms' Reports, for the year ending 31st March, 1872, from W. R. Robertson, Esq., the Superintendent.

Journal of the Asiatic Society of Bengal, Part I., No. 1 of 1873, from the Society.

Proceedings of the Asiatic Society of Bengal, Nos. 3 and 4, March and April, 1873, and No. 5, May, 1873, from the Society.

Memorandum on the Metals and Minerals of Upper Burmah, by Captain A. Stroker, Political Agent, Mandalay, from the Government of India, Department of Agriculture, Revenue, and Commerce

A few seers of Backergunge seed paddy, from the Rajah Suttia Nund Ghosal Bahadoor

Assortments of seeds of forest and other trees and shrubs, from Dr. B. W. Bouvia, Lucknow, Dr. George Henderson, Officiating Superintendent, Royal Botanical Garden, Shillong, and Baboo Prosanto Comar Banerjee, Calcutta.

#### VIRGINIA TOBACCO

Read the following report from the Tobacco Committee on the samples of tobacco leaf grown in the district of Jessore, from acclimatized Virginia seed, which samples were referred to them for report at the last meeting.

"I consider that these are fair specimens of Virginia tobacco leaf. There are a few thin leaves among them, but the greater number are good leaves. The leaves have been dried but they are not cured. One side of the leaves has attained the proper colour, but the other side is of a darker tint, and this shows that the tobacco has not been properly exposed when drying. The tobacco might now be cured if the leaves were hung on strings and allowed to imbibe the moisture of the atmosphere and then packed, so as to heat and sweat, and then gradually they will become cured and become tobacco. At present the leaves are the same as the Native Sooka."—WILLIAM SWINHOE.

"If better prepared, the present value of this tobacco in the Bazar would be about Rs 6 per maund, but in its present state it would not fetch more than Rs. 4 to 5."—EDWARD VANCELSAM.

"It is the same story about Bengal tobacco, fine quality, but badly cured. Unless the Government takes some steps to teach Natives how to cure tobacco, the cultivation will prove unprofitable. I am satisfied that tobacco could be grown in Bengal equal to the best Brazilian tobacco, which is largely imported

into Havana and re-exported to Europe as Havana-grown tobacco."—~~CHARLES~~  
~~FARRER~~ TONNREE.

Resolved to ask the Council to consider as to the best means for adoption by the Society for promoting the proper cultivation, skilful curing, and preparation of tobacco of the best description as an article of commerce.

#### GUM OF THE COORTAH TREE OF CACHAH.

Read letter from the Officiating Under-Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, intimating that in compliance with the wishes of the Society, the Government of Bengal has been requested to supply 50 to 60 lbs. of the Gum of the Coortah tree, for transmission to Dr. Forbes Watson, for experimental purposes, as stated in the Proceedings of the 24th April last

#### JAPAN SILK WORM COCOONS.

Read letter as follows from Mr E. G. Buskin reporting on cocoons, the produce of some Japan eggs, sent by the Society to Captain James Murray, at Dherubdhur, in February last.

"I am in receipt of your note with a box containing six silk cocoons, received from Captain Murray, being the produce of the Japan eggs you forwarded to him in February last.

"I find the cocoons very good indeed, and the weight of silk considerably greater than in our best Bengal cocoons. It would be interesting to know whether Captain Murray found the worms thrive well and what was the proportion of cocoons produced to the number of worms hatched.

"I made a small experiment here with the same eggs, and send you herewith 6 of the cocoons produced. I can find no difference in any respect from those sent by Captain Murray, but a great many of my worms died in the early and middle stages."—E. G. BUSKIN.

The Officiating Secretary reported that a copy of Mr. Buskin's letter has been sent to Captain Murray to elicit the information called for.

Agreed to ask Captain Murray to send a sample of the reeled silk for examination and report.

#### VEGETABLE AND FLOWER SEEDS.

Read letter from Messrs. Vilmorin, Andrieux, and Co., of Paris, enclosing Bill of Lading for the Society's shipment of seeds, per S. S. *Bertha*.

The Officiating Secretary stated that the Str *Bertha* was fully due, and that the American assortment of seeds per *City of Oxford*, has been landed in good order and is now in course of distribution.

**FIELD SEEDS.**

Read letter from Messrs. Law, Somner, and Co., of Melbourne, intimating that they are waiting for a ship for Calcutta, to enable them to execute the Society's order for "Field Seeds," but that there is much difficulty in procuring good Wheat Seeds.

The Secretary was requested to endeavour to obtain reports of the result of the wheat crops from those members to whom seeds were last distributed.

**TUBERS OF BEGONIA SEEDLINGS.**

Read letter from Dr. Thos. Beaumont, of Indore, as follows: "I send you enclosed 20 tubers of Seedling Begonia hybrids raised from seed obtained by crossing Pearcei and Sedeni; Pearcei and Boliviensis, probably, as these three are comparatively new varieties, you may not have them in your gardens."

The Officiating Secretary reported that the tubers had been five days in transit: they were despatched from Indore, on the 31st May, reached him on the 4th June, and were made over the same day to the gardener of the Society to plant them at once and give them every care, as they had suffered much in transit. The gardener reported three only had arrived alive.

**SEED PADDY.**

The Officiating Secretary reported that he received from the Rajah Suttayanund Ghosal, a few seers of Backergunge Seed Paddy, which enabled him to meet the requirements of Messrs. S. E. Peal and W. F. Gibbon, for a variety of paddy which will yield a large grain rice, having strong stems, or stalks, such as will stand heavy rain, wind, and inundation.

The thanks of the Meeting were awarded for the above presentations and communications.

**VACANCIES IN THE COUNCIL.**

The Officiating Secretary reported three vacancies in the Council, namely, by departure to England, of Messrs. A. H. Mowbray, Archibald Rogers, and Samuel Jennings, and that Dr. Geo. Henderson, and Messrs. Wm. Pigott and W. H. Cogswell had been nominated by the Council, and signified their willingness to fill the vacancies both in the Council and in the Garden Committee.

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*Thursday, the 24th July, 1873.*

J. A. CRAWFORD, ESQ., *President, in the Chair.*

The proceedings of the last Meeting were read and confirmed.

The following gentlemen were elected ordinary Members:

Secretary, Government Botanical Garden, Monghyr, Secretary, Local Funds,



Nisar Khundwa, Mr W Shipp, C. S., Honorary Secretary, Nynedai Club, Messrs A B Inglis, E A. DeSilva, and Mr. E Dalghesh

The names of the following gentlemen were submitted as candidates for election

1 Di Charles Barclay, Deputy Inspector General of Hospitals, Hyderabad Subsidiary Force, Secunderabad Deccan,—proposed by the President, seconded by Mr W Stalkartt

2 Henry Turnbull Hynde, Esq, Manager, Raneegunge Coal Association, Raneegunge,—proposed by Mr Thos Hindhaugh, seconded by Mr S H Robinson

3 John Leonard Reuss, Esq, Merchant, Calcutta,—proposed by Mr W Alexander seconded by Mr W H Cogswell

4 W F Ward Esq Civil Service, Calcutta,—proposed by the Hon'ble L S Jackson seconded by Mr J A Crawford

5 Alfred Carrutt Esq, Merchant, Calcutta,—proposed by Mr E G Buskin seconded by Mr S H Robinson

6 Political Agent, Morar, Gwalior —proposed by the President seconded by the Officiating Secretary

7 Secretary, Queen's Garden, Delhi,—proposed by the President, seconded by the Officiating Secretary

8 Conductor Thomas Cole, Esq Secunderabad, Deccan,—proposed by Captain W Franklin seconded by Mr S H Robinson

9 P L F C Langlois, Esq, Barrister at Law, Oorigapatam,—proposed by Mr A Hyslop seconded by Baboo Pary Chand Mitta

10 J Dodds, Esq, Merchant, Calcutta,—proposed by Mr W. Stalkartt, seconded by the President

11 Michael Fox, Esq, Kuttee, Shahabad,—proposed by the President, seconded by Mr W Stalkartt

12 Arthur Bonnatud Esq, Merchant, Calcutta,—proposed by the President, seconded by Mr L Zinder

\* The following contributions were announced

Memoirs of the Geological Survey of India, Palaeontologia Indica, Vol I, Part I, from the Superintendent

Records of the Geological Survey of India, Vol V, Part 4, two copies, and Vol VI, Parts 1 and 2, two copies of each, from the Superintendent

Proceedings of the Asiatic Society of Bengal, No IV, June 1873, from the Society

Annual Report of Agricultural and Horticultural Society of the Central Provinces for 1872-73 from J F Muir, Esq, Personal Assistant to the Chief Commissioner, Central Provinces

Report on the Jarrah Timber of Western Australia, from the Author  
Address by Dr. H. Cleghorn, delivered at the Nineteenth Annual Meeting  
of the Scottish Arboricultural Society, from the author

Proceedings of the Madras Agricultural Society of Meetings held on the 7th  
May and 4th June, 1878, from the Society

Journal of the Asiatic Society of Bengal, Part I., No. II., from the Society

A shrub known at Bombay as the Australian nettle, a species of *Acalypha*,  
from Cecil Stephenson, Esq

A packet of seeds of ornamental grass of kinds, from Baboo Gonendia Nath  
Tagore

One packet each of seeds of *Col illea Racemosa* and species of *Bauhinia*  
bearing a large white flower, from Richard Dombal, Esq

An assortment of seeds of trees and shrubs, from Dr W Jameson, of Sala-  
munpoor, to meet requisitions from members and others

An assortment of seeds of trees from the Royal Botanical Garden, for trans-  
mission to the Royal Botanical Garden, Mauritius

A small quantity of *Coffea* seeds and a few young plants of *Theobroma Cacao*  
from Dr Geo Henderson Royal Botanical Gardens Seebpoor

#### TEA BRIGHT

Read letter, as follows from Dr R A Barker of Soory Beerbhoom

"I enclose a few small insects which have been found on the tea bushes in  
the Darjeeling Terrace They are, I believe, the larvae of a butterfly, and bears  
a close analogy to the tortrix of the oak tree The insect, a caterpillar,  
envelops itself in a web, which is externally protected with thin twigs of tea  
plant, packed closely side by side, longitudinally It propels itself with the  
fore part of body and eats the tea leaves"

These appeared to be similar to those received from Mr Pinny from Bungalow,  
Assam *Fide* Monthly Proceedings, dated 29th May, and sent to Mr James  
Wood Mason for identification

#### WATER MELON.

Read letter from Mr. E C Buck, of Cawnpore, as follows

"I send you a water melon grown from seed, brought by Meer Imdad Ali,  
Deputy Collector of Cawnpore, from *Mexico* The melon is, I think, of a superior  
class There is hardly any hollow in it, and in some specimens the pink colour  
extends nearly to the rind. The flavour appears delicate.

"I will send down a packet of seed for distribution.

"This melon was grown by cultivation in the ordinary way on river sand.

"I don't know that the fruit will be in an eatable state on arrival, but by  
cutting it open, the difference from the ordinary fruit will be seen"

The melon was found to weigh 19 lbs., to answer the description given by Mr. Buck, and whose kind offer of some seeds for distribution to the members of the Society was accepted, with thanks.

#### COSALPINTA COMARIA.

Read letter from Dr. Henderson enclosing one to his address from Mr. F. W. Tytler, Newton Estate, Dimbulla, Ceylon, asking for much detailed information respecting the cultivation and uses of this beautiful tree, and its product.

The Officiating Secretary reported—The Society have no records of the uses of the tree commonly called Divi Divi, other than its cultivation for its pods, which are said to contain about 50 per cent. of tannin, and that a single full grown tree in the West Indies will yield yearly 75 lbs. of tanning material, but being unable to give in full the detailed information called for And as the tree is common in the Madras Presidency, it was proposed to recommend Mr. Tytler to apply to the Agricultural Society there.

It was considered by the meeting very desirable that the Society should have specimens of all known tanning and other agricultural products for reference, and at the suggestion of Dr. Henderson, it was resolved to recommend to the Council to consider the subject of establishing a small economic Museum of such products, and to ask some aid from the Government of Bengal towards the expense of maintaining it, it being reported that there will be no room in the Imperial Museum for such a collection, as was originally intended.

#### JAPAN SILK WORM COCOONS.

Read letter from Captain James Murray, expressing regret at inability to meet the wish of the Society for a sample of reeled Silk from the Japan worm raised at Dhera Dhoon, not having any, as he had allowed the moths to cut their way out for the purpose of collecting eggs.

#### SUNDRY APPLICATIONS.

Read letters from the Deputy Commissioner of Ramree for 8 lbs. of Tobacco and from the Honorary Secretary, Agricultural and Horticultural Society, Central Provinces, Nagpore, for Cypress seeds, and from the Collector of Midnapore for seed Potatoes.

The Officiating Secretary said, the applications for Tobacco and Cypress seeds had been met as far as practicable, and he had replied to Mr. Harrison, the Collector of Midnapore, that seed of country potatoes would be available next month; that the Society's supply of English seed potatoes had all been disposed of.

#### EXHIBITION OF GRAPES.

Mr. John F. Hamer was good enough to present the Society with a bunch of grapes, grown in his garden at Calcutta. Mr. Hamer writes:

"I have pleasure in sending a bunch of grapes, the *Isabella* I believe, taken from my garden this morning in Calcutta, which perhaps you will be kind enough to present to the Meeting this afternoon. It is one of many bunches I have had since April last, and as I have been recommended to forward it to you, it gives me great pleasure to do so. It shows the possibility of the fruit being brought to perfection in Calcutta by good pruning and manurings at their respective seasons. The vine is only 2½ years old, and is perfectly healthy, the fruit, as it becomes purple, is remarkably sweet and of fine flavour."

REPORT ON GARDEN SEEDS.

A report on this season's consignment of American Seeds, imported last month, was submitted by Mr. Head, the Gardener, to the effect that a trial sowing had proved satisfactory, shewing a good percentage of germination, especially in the peas which returned 95 to 100 for 100 sown, most of the other vegetables 40 to 65 per cent, and 3 kinds only had not germinated up to 24th instant, the whole having been sown on 2nd instant. Four kinds of flower seeds sown had also germinated fairly.

The thanks of the Society were awarded for the above presentations and communications.

*Thursday, the 21st August, 1873.*

J. A. CRAWFORD, Esq., *President in the Chair.*

The proceedings of the last meeting were read and confirmed.

The following gentlemen were elected ordinary members.

Messrs. Arthur Bonnaud, Alfred Carritt, J. Dodds, Michael Fox, Henry Turnbull Hyde, P. L. F. C. Lauglois, John Leonard Reuss, W. E. Ward, Conductor Thos. Cole, Dr. Chas. Barelay, Political Agent, Morar, Gwalior, and Secretary, Queen's Garden, Delhi.

The names of the following gentlemen were submitted as candidates for election:

Wm. Duthoit, Esq.,—proposed by Sir John Wemyss, Bart., seconded by Mr. T. H. Wordie.

Augustus S. Harrison, Esq., Principal of the Minor College, Allahabad,—proposed by Dr. Jas. Irving, seconded by the President.

H. G. Lindsay, Esq., Khobong Factory, Dibrughur, Assam,—proposed by the Officiating Secretary, seconded by Mr. W. Swinhoe.

S. M. Barry, Esq., Jr., Dilkoocha Tea Garden, Cachar,—proposed by Mr. J. Mackillican, seconded by Mr. J. M. Wood.

Mr. W. L. Gale, Esq., Indigo Planter, Pundowl Concern, Tirhoot,—pro-

proposed by Mr. S. H. Robinson, seconded by the President.

W. S. Mackenzie, Esq., Indigo Planter, Belasaid Concern, Tirkoot,—proposed by the Officiating Secretary and seconded by Mr. W. Swinhee.

The following contributions were announced :

Records of the Geological Survey of India, Vol. VI., Part 3 for 1873, from the Superintendent.

The Flora Sylvatica for Southern India, Part XXVII., from the Government of India.

Report on Meteorology, Museum, and Horticultural Garden in the Province of Oudh, from the Government of India.

Calcutta Milk—an Analytic Report and remarks, by Dr. F. N. Macnamara, M. D., from the author.

Report on the Cultivation of Flax in India, from W. H. D'Oyly, Esq.

Proceedings of the Asiatic Society of Bengal, No. VII. for July, 1873, from the Society.

Two hundred and thirty Rose plants of 45 varieties, for the Society's new garden at Alipore, the varieties being principally General Jacqueminot, Souvenir de Count Cavour, Madam Clemence Joigneaux, River's Geo. the IV., Prince Camille de Rohan, and Alfred Rougemont, from H. C. Levinge, Esq., of Arrah.

Two young mahogany trees from W. H. Cogswell, Esq.

A box of Messrs. Sutton and Sons' Vegetable seeds, from W. H. Jones, Esq.

C. 2, M. 1. and C. 1. M. 2, 2 Vols. de Journal du Jardin Impérial de Botanique de St. Petersburg, from the Directeurs.

#### TEA BLIGHT.

Read letter, from Major Julian Hobson, from Ameerghur, as follows :

"In the *Pioneer* of the 7th instant, I observe a letter of Dr. R. H. Baker, of Soory, Beerbhoom, read before the Agricultural-Horticultural Society of India, in which he describes some small larvæ found and feeding on the tea plant. He believes them to be the larvæ of a butterfly (I presume he means moth) closely analogous to the Tortrix of the Oak tree. From the description Dr. Baker gives of the larvæ, I am inclined to think that the larvæ are a new and undescribed species of *Oiketicus* of the *Hepialidæ* family, whereas he places them among the *Geometridæ*, but he could easily set the point at rest, as the larvæ of the former family have six pectoral, 8 ventral, and 2 anal feet, whereas in the latter family the larvæ have three pairs of pectoral legs, a single pair of ventral jewlegs, and a pair of anal legs. Again, the larvæ of the *Geometridæ* when disturbed, drop themselves down from their encasement made by the larvæ, and suspend themselves by their silken cords, whereas should the specimen sent by Dr. Baker be, as I conjecture, an *Oiketicus*, it will be with the

greatest difficulty that the larva can be extracted from its fascine-like mass. Lastly, the female moth, if an *Oiketicus*, would be apterous, never leaving the puparium which is not the case of the Tortrix Genus.

The Officiating Secretary said that Dr. Barker had been requested to obtain and send to Major Hobson a specimen of the grub.

Agreed, that copy of Major Hobson's letter be sent to Mr. James Wood-Mason who has the specimen for identification, also to Dr. Barker.

#### FLAX CULTIVATION AND MANUFACTURE.

An interesting paper on this subject was brought forward, presented by W. H. B'Oily, Esq., c. s., who had prepared and submitted it to the Government of Bengal, in the Department of Agriculture, accompanied by certain suggestions for the aid of Government, being afforded for the encouragement of the permanent growth and preparation of this staple. Referred to the Council for report.

#### CÆSALPINIA CORIARIA.

Major Hobson favoured the Society with the following copy of correspondence between the Government of Bombay and the Chamber of Commerce of that Port, regarding the divi-divi or pod of the *Cæsalpinia Coriaria*.

From James Taylor, Esq., Secretary, Chamber of Commerce, Bombay, to F. S. Chapman, Esq., Chief Secretary to Government, Bombay, dated 28th April, 1869.

"Adverting to former correspondence on the subject of the divi-divi samples sent to England by the Chamber on behalf of Government for report, I have now the pleasure to hand you copy of a report giving an analysis of the properties and chemical characteristics of the sample sent from this country, as compared with the divi-divi imported into England from South America by Dr Stenhouse, Assayer to the Royal Mint, London

"Messrs. Smith, Fleming, and Co., when sending this report to the Chamber, mentioned that they had sent the remaining portion of the sample to a tanner, and that they would in due course communicate the practical result of any experiment that may be made.

"The Committee of the Chamber are, however, of opinion, that sufficient information has already been elicited as to the value of the article to justify Government in doing all in its power to promote the cultivation in suitable localities, of the *Cæsalpinia Coriaria* tree, which produces the pods known in commerce as divi-divi."

Report by J. Stenhouse, Esq., LL.D., F. R.S., &c, Assayer to the Royal Mint, dated 21st January, 1869, on two samples of divi-divi—one South American, and the other Bombay, received from Messrs. Smith, Fleming, and Co.

"Divi-divi is the pod of a leguminous shrub *Casalpinia Coriaria*, which grows to the height of about 20 or 30 feet in several districts of South America; the pods being usually exported from Carthagena. It also occurs in the Island of Jamaica.

"The South American variety is usually of dark brown colour, and varies in size, being generally from two to three inches long and half an inch broad. The specimen of this variety which I received from Messrs. Smith, Fleming, and Co., is rather smaller than I have generally met with. The pods are very much curled, as if they had been strongly dried, and contain a few flattish seeds. Its taste is highly astringent and bitter, but the astringent matter is contained only in the outer rind of the pod; the inner skin which encloses the seeds is nearly tasteless. The pods are often perforated with small holes, evidently the work of some insects, and their aqueous solution gives a copious precipitate with gelatin, and a deep blue colour with persalts of iron.

"The sample of divi-divi from Bombay is of a paler colour, and the pods are considerably larger than the South American.

"The amount of tannin in the two samples was carefully determined by Shuler's process with gelatin and salummoniac, and found to be as follows:

	South American.	Bombay.
Tannin . . . . .	19.0 per cent	15.6 per cent.

"From these results it will be seen that Bombay divi-divi is not so rich in tannin as the ordinary South American kind; 100 parts of the latter being equivalent to about 126 of the Bombay divi divi for tanning purposes. But as in these two particular samples the Bombay pods are both larger and heavier than the South American samples, the deficiency in tannin might be more than compensated by the increased weight of the divi-divi the trees would yield.

"Some thirty years ago some calico printers endeavoured to employ divi-divi as a substitute for galls, but the large quantity of mucilage it contained rendered it unfit for the purpose.

"It is, however, pretty extensively employed in tanning leather, as the percentage of tannin it contains is considerable, and the presence of mucilage is not injurious in that process."

#### TEA MANURES AND FERTILIZERS.

Read letter as follows from Mr. Jas. G. Bellairs, dated 12th August, 1873, from Chowkooree Tea Factory, Kumaon.

"You will no doubt remember having supplied me with a small tin of Tea Fertilizer. Well, I applied the same to 24 plants in February last. To the first plant, in a line, I gave one dessert spoon, mixed with two of fine earth; to the second, two dessert spoons of this manure with four of earth, and so on to the last

which received twenty-four spoonful with forty-eight of earth. I have watched the plants most carefully and in no respect can I see them to be better than their neighbours, nor can I see that this twenty-fourth plant is in any way better than the first, although it had so much more of the manure. I should mention that I have only 35 acres under Tea, being a believer in a small acreage closely planted, and high cultivation; and that for the last four years I have every winter given each plant, applied round the roots, two seers of good dung, and perhaps that may account for the Fertilizer showing no good effects.

"On gardens, with next to no farm-yard dung, I have little doubt, but what the fertilizer would be of the greatest benefit."

Read letter from Officiating Under Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, calling for reports on the experimental uses of the six casks of Compton's Tea Manure.

The Officiating Secretary stated, that he had distributed the manure in question to Messrs. Begg, Dunlop, and Co., W. Minto, Henry Raban, Kunchunpore Tea Company Limited, and J. Brownfield, but that no reports had yet been received from them, nor any replies to special applications to return reports.

#### AGRICULTURAL SEEDS.

Read letter from Messrs. Law, Sonner, and Co., of Melbourne, advising shipment per ship *Hereford* of 800 lbs. of Lucerne, and a few other field crop seeds for the Society.

The *Hereford* having arrived, these seeds to be advertised for distribution to such members as require them.

#### TREE LOGS FOR ORCHIDS.

Read letter from Mr. T. M. Francis, as follows:

"Many members of the Society must have been annoyed to find that the logs on which their orchids were grown had been destroyed by white-ants. This may be obviated by using freshly-cut logs of the *Pterocarpus marsupium*, a common Indian tree. The logs are to be planted in ordinary garden soil, and will send out shoots in a week or ten days, if fresh. In a month or two, each log will have become a flourishing tree, and orchids fastened on it grow with much more vigour than if fastened to a log of dead wood. The logs may be planted either in the open ground or under a portico, according to the description of orchids intended to be grown on them. I send herewith a branch from one of several logs which was planted in my garden only a few weeks ago, and all of which are doing well.

"The peculiar properties of this tree were known many years ago, (as you will see by the enclosed extract from the Horticultural Transactions, Vol. IV., p. 226.)



and the mode of growing orchids which I have described is practised by several gentlemen here; but I do not think that it is as generally known as it deserves to be.

"In conclusion I may mention that the native name of the *Pterocarpus marsupium* (in Calcutta at least) is *Jeol*."

The extract referred to by Mr. Francis is as follows: "The following curious fact, recorded by Mr. Livingstone, which seems to have escaped observation, deserves to be mentioned here.—"The *Pterocarpus marsupium*, one of the most beautiful of the large trees of the East Indies, and which grows in the greatest perfection about Malacca, affording by its elegant wide-expanding boughs, and thick-spreading pinnated leaves, a shade equally delightful with the far-famed tamarind tree, is readily propagated by cuttings of all sizes, if planted even after the pieces have been cut for many months, notwithstanding they appear quite dry, and fit only for the fire. I have witnessed some of three, four, five, six, and seven inches in diameter, and ten, or twelve feet long, come to be fine trees in a few years. While watching the transformation of the log into the tree, I have been able to trace the progress of the radicles from the buds, which began to shoot from the upper part of the stump a few days after it had been placed in the ground, and marked their progress till they reached the earth. By elevating the bark, minute fibres are seen to descend contemporaneously as the bud shoots into a branch. In a few weeks these are seen to interlace each other. In less than two years the living fibrous system is complete, in five years no vestige of its log origin can be perceived, its diameter and height are doubled, and the tree is in all respects as elegant and beautiful as if it had been produced from seed."

#### CULTIVATION OF FERNS AND EXOTICS

Read extract of letter from Colonel Willoughby Osborne, of Sehore, Bhopal, as follows:

"The Ferns I brought from Simla, and those I sent from there by post, are thriving splendidly. I find Ferns can be sent safely thus. Select a plant with several young fronds, cut off the large leaves and wrap the roots in moss well damped. Cover the moss with India Rubber tissue, tie with string and put in a card-board box, with a few holes in it, and send by post. I have now in my glass-house 52 kinds of Ferns, in all about 76 dozens of pots.

"I have Fuchsia, English and from Simla, in full blossom, and Hydrangeas and Pelargoniums.

"I find my green-house answer admirably: it is entirely of glass except walls for 6½ feet. I have blinds of plain white longcloth, on rollers, and I found in the hottest weather the thermometer inside never rose above 95 whilst in the sun it was 142° to 145°."

The thanks of the Society were awarded for the above presentations communications.

*Thursday, the 18th September, 1873.*

*J. A. CRAWFORD, Esq., President in the Chair.*

The proceedings of the last meeting were read and confirmed.

The following gentlemen were elected members :

Messrs. Wm. Duthoit, Augustus S. Harrison, H. G. Lindesay, W. L. Gale, and W. S. Mackenzie.

The names of the following gentlemen were submitted as candidates for election :

1. Manager of the Doomra and Rajapatty Indigo Concern, Tirhoot,—proposed by Mr. S. H. Robinson and seconded by Mr. R. Blechynden.
2. George Stevenson, Esq., Civil Service, Pooree,—proposed by Mr. Joseph Samuel Armstrong and seconded by the President.
3. Cantonment Magistrate, Cawnpore,—proposed by the President and seconded by Mr. S. H. Robinson.
4. J. M. Scott, Esq., Professor of Civil Engineering, in the Presidency College,—proposed by Mr J. E. Radcliffe and seconded by Mr. S. H. Robinson.
5. F. W. Simmond, Esq., Larsingah Tea Garden, Cachar,—proposed by Mr. J. A. Thompson and seconded by Mr. R. Blechynden
6. H. S. Wyllie, Esq., Seohurbund Tea Garden, Cachar,—proposed by Mr. J. A. Thompson and seconded by the President
7. Baboo Benod Behary Mullick, Calcutta,—proposed by Mr. W. Swinhoe and seconded by the President.

The following contributions were announced :

Journal of the Asiatic Society of Bengal, Part II., No. III, 1873. From the Society.

Transactions of the Royal Society of Arts and Sciences of Mauritius, Vol. VI. From the Society.

Report on the progress and condition of the Royal Gardens at Kew, during the year 1872. From Dr. J. Hooker.

Lahore to Yarkand, by Dr. Geo. Handerson and Allan O. Hume, Esq. From Government of India, Department of Agriculture, Revenue, and Commerce.

Report of the Quarterly General Meeting of the British Indian Association, held on the 30th September, 1872. From the Association.

Eleven old Nos. of the Journal of the Agricultural and Horticultural Society of India. From J. A. Crawford, Esq.

A packet of seeds of the Mecca Water Melon. From E. C. Buck Esq., Cawnpore. See Proceedings of Meeting of 21<sup>st</sup> July, 1873.

A packet of seeds of the Carob tree (*Ceratonia Siliqua*.) From Geo. Ricketts, Esq., Allahabad.

#### METCALFE HALL REPAIRS.

The Officiating Secretary reported, that a letter had been received from the Secretary to the Government of Bengal, announcing that His Honor the Lieutenant-Governor had promised a contribution of Rupees 5,000 from Government, towards meeting the expenses of the repairs of the Hall, the estimate for which was over 16,000 Rs., and that endeavors are being made to meet the balance by asking for a contribution from the surplus Mayo Memorial Fund and from other resources.

#### TEA MANURE AND FERTILIZER.

Read the following letter from Messrs. Begg, Dunlop, & Co., reporting on experimental trials of Compton's Patent Manure and Messrs. Samuel and Sons' Tea Fertilizer.

"The Manager of the Garden to which we sent the parcel of Compton & Co.'s Patent Manure, you kindly gave us for experiment, writes about it as follows, under date 11<sup>th</sup> ultimo :

"The  $\frac{1}{2}$  inch bones from the Agri and Horticultural Society, have not done anything, the yield at date being 60 lbs. from the unmanured and 68 from the manured."

We may mention that we also sent to the same garden a supply of Messrs. Samuel and Sons' Tea Fertilizer, and the results from its application are reported thus, under date 15<sup>th</sup> July. "I applied  $\frac{1}{2}$  of a lb. to each bush, fenced off the plot, and at the same time fenced off another plot adjoining, containing the same number of bushes. The results at date are from manured plot 174 lbs., unmanured, 112 lbs., a difference of 62 lbs. Three weeks after application, the manured land gave 38 lbs., unmanured, 14, and since then the difference has been smaller."

Another correspondent writing about some bone manure (which we believe is the same as the Compton's you supplied) obtained from Ker, Dods, & Co., says, "I believe by itself it would not be of much use, though I consider it is a valuable addition to oilcake and all similar stimulating manures." In the case now referred to, "the bone dust was applied in conjunction with oilcake (a very small proportion of the bones in the mixture) and is reported to have given so far very satisfactory results, and the effects of the manure are expected to continue all through the season."

THE BRIGHT

Read a letter from Mr. G. E. Pinney, of Rungajam Factory, Jorahat, Assam, forwarding specimens of an insect, generally called "Black little Bug" most destructive to tea bushes, every nibbled leaf turning red, asking for identification and report as to the best means of preventing its ravages.

The Officiating Secretary reported that these insects had been sent to Mr. James Wood Mason, Curator of the Asiatic Society with the request that he would be kind enough to give a report on them and that several other specimens were already with him awaiting identification.

CITRATONIA SINQUA

Read letter from Geo. Rickett Esq. of Allahabad, with some seeds of the Italian Citrati tree as follows.

I have many of them by me I have a small packet of the Italian Citrati tree (Citrati) which I doubt you know the tree and its properties. It flourishes in the country and in the country end of the Neapolitan State and Calabria. It grows my where and stands heat and cold. I think it would be a valuable tree to introduce into this country, and I have sent you a packet of the seeds in 1852. I sent the seeds to the Punjab where it has been sent to both at Lahore and at Peshawar. It has been raised from my seed. I saw a plant of it and it was at Bures, one of these trees and the only one I have seen was moved to Calcutta where it has grown exceedingly well. It is nearly 20 feet high and 9 inches in diameter, and stands the climate perfectly. Undoubtedly it is a single tree which I am told is still to be found in Italy. I send you the first that have been obtained from the trees at Calcutta. It is proved that it will thrive in the Punjab and in these provinces and I hope you will succeed with it in Calcutta.

The seeds should be well sowed before planting and the trees when planted out, should not be too far from each other to ensure their fruiting. I believe it would be a very valuable thing if generally introduced into India.

The Officiating Secretary reported that twelve months ago, the Deputy Commissioner of Nizam's Provinces applied to the Society for seeds of the Citrati tree, to whom a few of these seeds have now been sent.

Ordered, that the remainder of the seeds be sent to the Society's Garden at Alipore.

GARDEN SLIDING TRIALS FOR MEMBERS

Read report from Mr. Head the Gardener of the trial sowing of some of French vegetable and flower seeds in the Society's Garden from which it appears that of the Cauliflower, Cabbage, Carrots, Asparagus, Radish, Turnips,

and Spinach, 12 to 81 per cent had germinated; the Peas, 84 to 100 per cent., and other kinds, from 20 to 80 per cent, and only 3 kinds out of 38 had not germinated up to date. Of the 30 kinds of flower seeds sown, 16 kinds had germinated from 10 to 75 per cent., up to date.

The report was considered a favorable one, and further trial recommended to be made after 1st November, when, probably, the flower seeds which would not germinate so early in the season as the trial now reported, would be found to give a good return.

Read also a letter from Mr. James Craven, a Member at Monghyr, stating that he had recently sown nine varieties of the Society's American and French vegetable seeds imported in 1872, and that more than 50 per cent., had yielded healthy seedlings. The varieties sown were sugar loaf, drumhead, early York, and red pickling Cabbages, Cauliflower, Brocolie, Lettuce, Celery, and Tomato. Mr. Craven writes, "the seeds had been put away in their original paper packets, in a stoppered bottle, just before the rains set in."

#### SPECIMEN OF LEAVES AND FLOWERS SENT FOR IDENTIFICATION.

Read letters from Captain Harris, Commander of the Steamer *Mullah*, forwarding specimens of frond of a Fern found at Serajgunge, asking its name, and inquiring if the Society would like a few plants. This proved to be the common yet pretty "*Hemellatus cordata*." Also letter from Mr T. F. Peppé, sending a handsome blossom of an orchid found growing in the jungles of Ranchoe. This appears to be "*Dendrobium formosum*," which is common in the Khasia Hills. Also a letter from Mr G. W. Stüttell, Rangoon, sending leaf of a specimen of a mulberry tree, and asking if it be not a degenerated variety of the "*Morus nigra*." On inquiry at the Royal Botanical Garden, it was found to be the leaf of the "*Morus Indica*."

The thanks of the Society were awarded for the above presentations and communications.

Thursday, the 20th November, 1873.

J. A. CRAWFORD, Esq, *President in the Chair.*

The proceedings of the last meeting were read and confirmed:

The following gentlemen were elected ordinary members:

Messrs. George Stevenson, J. M. Scott, F. W. Simmonds, H. S. Wyllie, Manager of the Doomra and Rajapatty Indigo Concern, Cantonment Magistrate, Cawnpore, and Baboo Benod Behary Mullick.

Rejoined, —Lieut. W. B. Collins.

The names of the following gentlemen were submitted as candidates for election :

1. Captain Stewart C. MacTier, Bengal Staff Corps, Allahabad,—proposed by Colonel J. Y. Gowan, seconded by Mr. S. H. Robinson.

2. Lieut. D. T. W. Dunn, 62nd Regiment, Dum-Dum,—proposed by Mr. J. M. Wood, seconded by the President.

3. Charles H. Lepper, Esq., Debroghur, Assam,—proposed by Mr. J. M. Wood, seconded by Mr. S. H. Robinson.

1. G. E. Powell, Esq., Saharunpore,—proposed by Mr. R. T. Greetham, seconded by the President.

5. T. Allan Brown, Esq., Deputy Collector, Allahabad,—proposed by the Officiating Secretary and seconded by the President.

The following contributions were announced :

1. Journal of the Asiatic Society of Bengal, part I., No. III. From the Society.

2. Records of the Geological Survey of India, Vol. VI., Part IV., for 1873. From the Superintendent.

3. The Flora-Sylvatica for Southern India, Part XXVII Dup. From the Government of India.

4. Memoirs of the Boston Society of Natural History, Vol. II., Part I., No. II., on the Early Stages of *Terebratulina septentrionalis*. From the Society.

5. Memoirs of the Boston Society of Natural History, Vol. II., Part I.-II., No. I., on the development of *Licluselus Polyptemus*. From the Society.

6. Memoirs of the Boston Society of Natural History, Vol. II., Part I., No. III., on the Osteology and Myology of *Didelphys Virginiana*. From the Society.

7. Proceedings of the Boston Society of Natural History, Vol. XIII., 1869-1871. From the Society.

8. Two old copies of the Society's Journal. From Captain W. G. Maitland.

9. An assortment of 70 packets of flower seeds from Milan, for the Society's new Garden, Alipore. From J. F. Galliffe, Esq.

10. A packet of Guinea grass seeds. From R. Nicholson, Esq., Manager, Kantil Estate, Mirzapore.

11. Two-rooted plants of the pain' leaf *Acalypha*. From Dr. Bonavia of Lucknow.

12. Seeds of the wild *Camellia* of Assam. From Dr. C. J. Simon of Assam.

13. Report on the Cultivation of the Mahogany Tree, from Surgeon Major Geo. Henderson, M. D., Officiating Superintendent, Royal Botanical Gardens, to the Government of Bengal. This Report contains valuable information on the result of sowings of Mahogany Seeds imported from Jamaica and from Dr.

Hooker, and of others, collected from trees growing near Barrackpore, and in the Botanical Gardens, and also instructions as to the time and mode of planting and cultivating the trees. It was referred to the Committee of Papers, as it appeared a desirable communication for republication in the Society's Journal.

14. Notes upon Garden Roses in India by Rev. I. A. C. Firminger, Honorary Member. Referred to the Committee of Papers.

#### MICAETE HAIL REPAIRS

By direction of the Council, the Official Secretary reported to the meeting that an agreement had been made with Messrs. Burn and Co., to replace all the decayed wooden architraves of the verandahs to execute the ordinary thorough repairs to the Hall, to provide the drainage arrangements of the premises in connection with the main drainage, and the water supply from the Municipal Water Works, for the total sum of Rs. 15,500 and that this outlay less Rs. 5,000 contributed by the Government of Bengal reported at the meeting of the Society in September last, would be borne in equal shares by the Calcutta Public Library and the Society.

#### TOBACCO CULTIVATION

Read the following report of the Sub-Committee appointed to consider the best means of promoting the proper cultivation and manufacture of Tobacco.

The Sub-Committee appointed to consider as to the best means for adoption by the Society for promoting the proper cultivation, shifling, curing and preparation of tobacco of the best description as an article of commerce, beg to report as follows:

1. That Mr. Swinhoe having kindly offered to make a selection from the 13 Prize Essays on Tobacco cultivation published by the Editor of the *American Agriculturist*, New York—

This offer should be accepted, with thanks and the selection reprinted with engravings for distribution to members, and for embodiment in the next number of the Society's Journal.

2. That samples of all the kinds of native tobacco that are imported in the state of leaf into the Calcutta market direct from the producing districts be procured for information of the Society, and that two mounds of each of the one or two best kinds be purchased with the view of getting them properly fermented and cured under the directions of the Tobacco Committee, and the results reported to the Society.

3. That information be called for and collected as far as possible from Members of the Society and others in all the districts of Bengal on the following heads:

1. The different kinds of tobacco grown and their current prices, with samples of each.

2. Description of the soil in which each kind is grown and how it is prepared for market

3. Whether any and what kinds are capable of improvement

4. That an experiment be made in the Society's garden at Alipore by growing sufficient quantities of the best kind for a fair and full experiment, and during the leaves under the supervision of the Horticultural Committee, an account to be carefully kept of the area planted, the yield in bushels, and the cost of cultivation and preparation, for report to the Society

WILLIAM SWINBOR

W H COUSWITT

W SIAKABATI

CHAS LABRI TONNIERF

PIARA CHAND MILLRA

MATTHEW HATT }  
Calcutta, 27th April 1873 }

The Office of the Secretary mentioned that the Report had been adopted by the Council and that orders had been passed by the Garden Committee to plant out about 4 to 500 plants from seeds of 1 American varieties in the Society's garden, for the proposed experiment in cultivation

#### STATUS OF GARDEN SEPTEMBER 1873

The following advertisement which the Council proposed to insert in the newspapers and to circulate to the Members was submitted and approved of

The Seed Committee are now preparing the seeds of grain seeds for 1874, and will feel obliged for any suggestions from Members as to the selection, time of arrival, &c, being sent in without delay

#### TEA BLIGHT

Read letters from Mr Mavik Pike of Singapore Tea Factory, Hylikandy, Cebu and from Mr Mor Muller of Paul abree, forwarding tea blight insects for identification

Read letter as follows from a Cebu planter

In the *Englishman* of the 14th September I see that the cause of Tea blight still seems to be a subject of speculation as to its cause, or if known to be an insect the insect causing it appears to be still a mystery to a good many interested in tea. I must, therefore crave a indulgence to the following remarks regarding tea blight, and have you a make what use you like of them for insertion in the daily papers or in your Journal

"This is indisputably caused by an insect and none other than the one reported on by Mr Peile, the discoverer of Aspidiot in the *Englishman* newspaper of the 20th March, 1873, and belongs to the bug species, subsisting on the juice of some plants, principally tea (in a tea garden), which they obtain by



tion through their sharp beaks or probosces. They are as a rule rather difficult to discover when young being so minute, and after tapping assuming the same colour as the leaf, through their bodies being semi-transparent and distended with sap, yet are very easily distinguished from any other insect which I have seen, infesting the tea plant, by the peculiar shape of a spiracle, for breathing through I presume, on its back just over and between the first and second pair of legs, and has a nub on the top of it, looking or giving it the appearance of a miniature drumstick. To give a more minute description of the insect (a young one) the following may be relied on: Body about 1-15 of an inch in length, of an obtuse shape ~~and soft~~, with a very small *nobbed* tail, of an amber colour and semi-transparent, but after puncturing leaves, when the body is then distended with sap, of a green colour, similar to the leaf on which it is discovered tapping; head, horizontal and beak or proboscis issuing from the fore-part of it; eyes, two in number apparently, and seeming to be fixtures, *i. e.*, incapable of being rolled about in their sockets; beak or proboscis about  $\frac{1}{4}$  or  $\frac{3}{4}$  of the whole body; length carried when not in use between the first and second pair of legs upon or beneath the breast; legs, six in number, treble jointed, the thigh, shank, and foot; antennæ, two in number of a purplish hue; apterous, *i. e.*, having no wings, very active when disturbed, running down the shoot.

"The insect on growing older and increasing in size assumes a deeper amber or orange colour. After moulting their skins, the antennæ get longer and turn to a black colour, is less active in moving or flying about in its perfect state, and is provided with wings of a dark (approaching to black) colour, measuring about the size of a mosquito of a medium size. These pests of the tea planter may be first discovered on the plants, or their tapping seen from about the middle of February, and go on increasing in numbers to the end of August, during which time, if a tea plant with fresh blight spots, which may be known by the light coffee liquor colour on its tender leaves, be looked over, the insects will most assuredly be found:—the best way of seeking for and procuring them is not to touch the plant till you have observed one (which is rather difficult after they have tapped, as their bodies being then distended with sap assume the colour of the leaf) and then to nip off the shoot a leaf or two below the leaf on which the insect is seen, and put it in a stoppered bottle till you get to the bungalow, and keep him in the manner described below.

"The foregoing remarks are made after close observation of the insects from shortly after their larva state to their last or adult state, and to prove to some planters that it was the insect which caused the tea blight, I brought in a young one from the garden and put it with a shoot (having on it a Pekoe bud, Pekoe leaf, and a Pekoe Souchong leaf) and a separate leaf in a quinine bottle covered with a punctured piece of writing paper having holes in it sufficient for breathing

purposes, yet small enough to prevent egress of the insect. On examination of the leaves and shoot (which were tender) 58 spots were seen on the Pekoe bud (the enclosed or embryo bud not being touched owing to the insect being young and weak to tap through the large Pekoe bud) 18 spots on the Pekoe leaf, and only 18 spots on the Pekoe Souchong leaf, making a total of 124 taps (if each spot indicated but a single tap, which I very much doubt) in 31 hours and 35 minutes. The spots turning of a brownish hue just after being tapped but changing to a black colour through oxidation by the air acting on the tapped tissue of the leaf.

*Note.*—By the above will be seen that the more tender the leaf the more it was tapped.

"The above experiment and others to prove that the tea blight is caused by an insect, and this particular insect, were undertaken with great care, and a powerful magnifying glass used to watch the process of tapping.

"The insect principally attacks the most tender leaves, shoots, and the terminal buds being most succulent and easy of being punctured or tapped, causing, in a few days, the leaf to curl up, and in some instances dry up altogether, giving them the appearance of manufactured tea on the bush. In other instances where the terminal bud (just after the plucking has been done) has been pretty freely punctured, future growth from that bud, is put a stop to until a new bud forms alongside the punctured bud or the lower buds begin to burst. In other cases where the blight spot is detected in the centre of the shoot (where the pith is in trees) the parts attacked seem apparently poisoned, and this I think must be the case, after noticing the effect the tapping has on the Pekoe buds which have been punctured severely.

"Regarding a preventative, unless a very expensive one indeed, I am afraid there is none, as the insect on arriving at its matured or perfect state is provided with wings, in which case it would be just as easy to annihilate the mosquito as these pests.

"In connection I see there is a manure just introduced, which in the prospectus, the introducer states the capability of its enabling tea plants to withstand blight. As the blight is caused by an insect and *not* engendered in the soil, I do not understand how it would act; I would therefore, if convenient, feel obliged by being informed on this subject. The manure is known by the name of the Tea Fertilizer introduced by a Dr. Brown."

#### MANURES.

Read the following letters reporting on manure, *viz.*, 1st from Mr. H. Raban of Gotoongu, and 2nd, from Mr J. P. Langlois of Chittagong, addressed to Messrs. McKnight and Co., Calcutta.

Mr Raban writes

"In reply to your letter of July 25th (which arrived during my absence) calling for a report on my experiments with Messrs. Compton's patent manure, I beg to inform you that in May last, I applied  $\frac{1}{2}$  lb of it per bush, mixed with twice the quantity of dry earth to 3 lines of plant the soil round the roots of the bushes was thoroughly loosened and weeded a trench was then dug round each plant about 9 in deep, into which the manure was sprinkled and covered up with earth, I cannot say that I consider the manured plant a bit better than the unmanured ones beside them, nor have they given my market perhaps however, one application of the manure is not sufficient to produce any visible effect, and I have again given the same bush a second application of  $\frac{1}{2}$  lb each. At the end of the season I will send you a further report.

Mr Langlois writes to Vice-Maximilien as follows

"According to my promise I have the pleasure to inform you of the result of my experiment with the Cirencester Manure I purchased from you. I have tried it comparatively with cow dung. I am plants of Cirencester against sixteen pounds of cow dung per bush (nine years old). The result shows an increased yield from Cirencester of one hundred and three pounds tea per acre, over unmanured bushes of the same size and age. I only noted an increase of twenty nine pounds from cow dung. My experiment was on a small scale (I only had ten casks of the manure) yet sufficient to give me a fair idea of its merits. I have observed no difference in the quality of the tea. Cirencester is undoubtedly a very valuable manure, but the price is unfortunately too high. I have used your Cirencester as a liquid manure. I hope other planters will also report the result of their experiments. The question of manure is a very important one."

Read letter from Secretary to the Government of India Department of Agriculture, Revenue, and Commerce asking for my reports collected on the experiments with Compton's Patent Manure.

Ordered that copies of the two reports that have come to hand be sent in reply.

#### NEW VARIETIES OF SUGAR CANE

Read letter as follows from Mr John Horn, Sub Director, Royal Botanical Gardens, Mauritius

"I have much pleasure in acknowledging receipt of your favors, dated 8th and 30th July last

"The case of plants and parcel of seed per 'Lord Channing' arrived in very fair order, a few days ago, and I beg to thank your Society for its kindness. I am now preparing the canes and hope to have them despatched by an early opportunity. I prefer sending them in Ward's cases to boxes. I shall also send

a few Wardian cases with flowering shrubs, palms, &c. I shall be glad of the continued favors of your Society, and at all times will be most happy not only to send it plants or seeds, but any information which it may desire from this place on Arbor-Agri-Horticultural matters.

"I was very much pleased with your last invoice which consisted of plants very much required here. I would, however, suggest that the seeds of *Dipterocarpus* being so short-lived, should be sown in the soil in Wardian cases.

"By an early vessel I hope to be able to inform you of the first consignment of canes and plants for the Society, which I hope will continue its favour."

CESALPINIA CORIARIA.

Read letter from the Secretary in England referring to the proceedings of the Society in July last, on a communication from Mr. Tytler of Newton Estate, Dimbulla, Ceylon, and stating that it is recorded in the Society's Journal, Vols. IV. and V., of 1845-16, that certain experiments were tried with the American Sumach or Divi-Divi, and a gold medal was awarded by the Society to Mr. John Teil of the Kidderpore Tannery, to mark its sense of Mr. Teil's disinterested services in bringing to public notice the useful properties of the *Cesalpinia coriaria*.

SUNDRY COMMUNICATIONS.

Read letter from Mr. J. Gouldhawke of Lohpore, Purneah, as follows :

"I send you to-day by dak bungy a small packet containing some berries that I collected from the fields after a shower of rain. They were found to be scattered over many miles of country, and everywhere natives assert that they fell during an ordinary shower of rain.

"I have nothing to do with the question as to how they came to be scattered on the same day (8th September) over such an area, as it is a matter of opinion whether they did not fall with rain. The object I now have in view is to ascertain what the berries are, and where procurable, as they are not indigenous to this district. Would you oblige me with the opinion of botanists as to their nature. I may mention that they are full of oil; that the berries when crushed burn with a clear light. They appear to have had a pulp covering them, some few of the berries still having more or less of this dried pulp adhering to them, though most are without it."

Also the following letter from Mr Kurz, Curator of the Royal Botanical Garden, in reference to the above.

"In absence of the Superintendent, I may inform you that the seeds you sent are those of *Tetranthera laurifolia*, Jacq., (of which *T. Roxburghii* is a mere variety.) It is a common plant over most parts of tropical India, and often enough planted in the plains of Bengal (I saw it also in Purneah District, and in the station of Purneah itself), but it is not indigenous there. In its natural habitats, it is restricted to gravelly and rocky soils, or to a substratum of such.

"The fact that all the seeds are fully developed and contain germinable embryos tend to shew that they cannot come from Bengal's alluvial plains, where *petrophilous* trees usually produce a large proportion of bad seeds, although externally well developed.

"Again, the fact that the fleshy epicarp (soft as it is) has disappeared so completely, would indicate action of water, and indeed the surface of the endocarp seems really to be macerated. Friction caused by a common whirl-wind would have left more distinct traces of the fleshy cover. All these extraordinary rains of peas, wheat, so-called blood and sulphur, &c., and even of fishes, owe their origin to whirlwinds either directly or (as in the case of fishes) to water-spouts, caused by whirlwinds travelling over waters. My explanation in the case of these Purneah berries is shortly this. Water-spouts are of frequent occurrence in Lower Bengal, especially in the Backergunge Division and Sylhet, where the hills rise abruptly on two sides, almost at right angles, bordering a three angular plain open towards west. Here the whirlwinds have to cross those extensive jheels which compel the inhabitants to keep up the communication amongst their villages by means of boats. At the same time this *Tetranthera* in question is very frequent in the surrounding diluvial and higher situated lands, growing especially along the banks of streamlets. It is naturally that the berries which float on water (for how many days I cannot say) and which are produced in abundance, would be carried down during heavy rains into the jheels below and there accumulate according to the prevailing currents. A passing whirlwind would cause a water-spout and carry these berries up into the clouds, while the prevailing south-west winds of September would drive the berry-laden clouds in the direction of Purneah. Such a supposition alone can explain the great quantity of berries, which Mr Gouldhawke states were scattered over many miles of country.

"Had the berries been simply stripped from the trees themselves, it would have been more probable that the fleshy cover would have remained better preserved, and that small fruits, leaves, &c., of other trees would have been carried away even in more conspicuous quantities than these berries.

"It would be easy, I think, to get information from the districts above-mentioned, whether there has been a whirlwind or water-spout on or shortly before the 8th September.

"There has also appeared a letter on this subject in the *Indian Daily News* of October 8th, with which you are probably acquainted."

Read letter from the Assistant Secretary to the Chief Commissioner of British Burmah forwarding six samples of Jute for report as to quality and market value. Referred to the Fibre Committee.

The thanks of the Society were awarded for the above presentations and communications.

*Proceedings of the Society.*

11.

*Thursday, the 18th December, 1878.*

J. A. CRAWFORD, Esq., *President in the Chair.*

The proceedings of the last Meeting were read and confirmed.

The following gentlemen were elected ordinary members :

Captain Stewart C. Mactier, Lieut. D. T. W. Dunn, Messrs. Charles H. Lepper, G. E. Powell, and T. Allan Brown.

The names of the following gentlemen were submitted as candidates for election :

Koer Juggut Sing, Tajpore, via Bijnore,—proposed by Mr. A. Boulderson, seconded by the Secretary.

T. Lewis Ingram, Esq., Barrister-at-Law, Lucknow,—proposed by the President, seconded by the Secretary.

J. E. O'Connor, Esq., Department of Agriculture and Commerce,—proposed by Mr J. M. Wood, seconded by Baboo P. C. Mittra.

John Boxwell, Esq., C. S., Nya Doonka,—proposed by the President, seconded by Mr. W. Stalkart.

W. F. Ponder, Esq., Barry Kandy, Cutchar.—proposed by Mr. J. Mackilltan, seconded by the Secretary.

The following contributions were announced :

1. Report on the Trade and Customs of British Burmah, for 1872-73. From the Chief Commissioner.

2. Report of the Committee of the Bengal Chamber of Commerce from May to October, 1873. From the Chamber.

3. Proceedings of the Agri-Horticultural Society of Madras for August, September, and October. From the Society.

4. Annual Report of the Royal Botanic Garden, Calcutta. From the Superintendent.

5. A packet of Nepal Chillies. From L. Berkeley, Esq.

6. Seeds of two kinds of fragrant melon seed from Buxar. From W. H. Bartlett, Esq.

Mr. Bartlett remarks, that with culture in manured soil, the smaller of these melons " may be grown to a size somewhat larger than a large goose's egg, with a bright yellow rind. The flavor is a slight sub-acid, exceedingly pleasant, with the addition of a little sugar. The time for sowing is June, though I think it might be sown earlier in Bengal, say April and May, and watered. The beds should be raised like those of a Tea nursery, and watered, if the weather is dry; its fruits from July to September.

" I also enclose seeds of another larger well-scented and very luscious variety, peculiar to the Deorah lands of Purneah and Bhaugulpore, the great thing is to sow them in raised beds."

7. Two grafts of the Kyzlabagh mango from Pakoor. From W. Forbes Graham, Esq.

8. A glazed case of plants and a few palm and other seeds from the Royal Garden, Kew. From Dr. Hooker, C. B.

The Gardener reports that of the 37 plants, four were found to be dead on receipt, and three have since died. The Palms, Anthuriums, and new kinds of Ixoras and Crotons, with other plants, are in good order, and most of them an acquisition.

9. A few choice seeds of new kinds of *Primula*, *Pelargonium*, *Begonias*, *Petunias*, *Chameranthemum*, (new species) and new variegated cockscomb. From W. Bull, Esq.

These have been transferred to the Society's Garden.

10. Twenty varieties of Sugar-cane. From Royal Botanic Garden, Mauritius. Mr Head reports the arrival of these canes in good condition.

11. A small quantity of seed of Libanian Coffee. From W. Bull, Esq. This plant is much larger than the ordinary Coffee, and it is stated to yield double the quantity per acre; they have all arrived in good order and are now thriving in the Society's Garden.

#### SAMPLES OF JUTE FIBRE FROM BRITISH BURMAH.

A report was read from the Fibre Committee (Mr. S. H. Robinson) on sundry specimens of Jute, referred to in last month's proceedings, which were forwarded by the Chief Commissioner of British Burmah. Ordered that copy of this report, which is not favorable, be sent to the Chief Commissioner.

#### VARIOUS COMMUNICATIONS.

Read letter from Principal Assistant to Conservator of Forests, British Burmah, forwarding four cakes from juice of *Landolphia Owariensis*, and requesting report thereon.

The Secretary stated that these cakes had been transferred to Messrs. Schroeder, Schmidt, and Co.

From L. R. Forbes, Esq., Palamow, with specimen of a fibre called "Cheent," a wild creeper, and requesting opinion on quality and botanical name of plant.

The Secretary mentioned that it would appear from specimens of leaf (flower not sent, but promised hereafter,) that this is identical with the well known "Jeetee" fibre of Rajmahal, the produce of *Maradonia tenacissima*.

From Under Secretary, Government of Bengal, forwarding a quantity (31 lbs.) of the gum of the "Coortah" tree of Cachar, as applied for by the Society in May last.

Agreed that this be transmitted to Dr. Forbes Watson, who has already favored the Society with a report on small specimen. (See Proceedings of April 1873.)

From Superintendent, Government Garden, Ootacamund, advising despatch of several packets of acclimatized flower seeds as applied for. One packet transferred to Gardener, the remainder to be tinned for distribution next year.

From J. Wood-Mason, Esq., India Museum, returning some specimens of tea blight, such as are in order, the rest having been thrown away as useless; and suggesting reference to Mr. F. Moore of the India Office Museum on all these subjects. "It is impossible," adds Mr. Mason, "to give the correct scientific names to these obscure insects in this country where neither extensive collections of named species, the accumulated results of the work of whole generations of naturalists, nor the requisite literature exist. The Society may not, perhaps, be aware that my friend Mr. F. Moore of the India Office Museum, is collecting materials for a work on 'insects injurious to vegetation,' and the Society would contribute greatly to the production of a work that is much wanted by sending all specimens such as those which have been sent from time to time to myself to that gentleman."\*

The Secretary mentioned that just before leaving England he had received from Mr. Moore, with whom he had been in frequent communication, a list of desiderata towards the work above referred to, which he was now endeavoring to meet. Agreed that Mr. Mason's suggestion be acted on.

#### PROPAGATION OF PLANTS BY LEAVES.

Mr. T. M. Francis submitted eight plants of *Begonia Rex*, the product of a single leaf, which was cut and inserted in sand on the 13th October last.

The Secretary remarked that though the propagation of plants by leaves had engaged the attention of the Society some years ago, as a reference to the Journal would show, wherein are recorded experiments of several members, the subject would appear to have been subsequently disregarded, as no further notices are alluded to; and he therefore ventured in the opinion that Mr. Francis was rendering good service to Indian horticulture in bringing the fact to notice and in the series of experiments which he was informed he had been instituting during the last two years, the result of which he intended submitting in due course to the Society. It must be borne in mind that we are still in the infancy of the subject as respects India: nor is this to be wondered at considering that it is only of recent years that the phenomena of leaf propagation has received in England the consideration that they deserve. Nor are gardeners to be blamed for this, for in so notable a work as DeCandolle's *Physiology* the subject is dismissed in two or three pages; whilst in a more popular publication, Lindley's "Theory of Horticulture," we are informed that, "although many leaves may be used for the purpose of propagation, yet that the greater part, when separated from their parent, are incapable of being so." Subsequent experience would seem to have proved the error of this remark; and in this country where trans-



mission of plants to distant places is not so easy as in England, illustrations of the successful multiplication of plants by leaves are not only interesting but important in a practical point of view, and may probably afford much aid to Indian gardening at no distant date.

#### BULBS OF ORNAMENTAL PLANTS.

The Secretary placed on the table a list of bulbs of ornamental plants which he had purchased from Mr. W. Bull, shortly before leaving England, for the new garden, consisting of *Begonias*, *Hloxias*, *Gesnerias*, *Achimenes*, *Caladiums*, *Cannas* of the rarer sorts; also choice kinds of *Dieffenbachias* and *Alocasia Zehryna*.

The Gardener reports that with the exception of six, all these are in good order. They will form a nucleus from which to distribute in due course to members.

#### EXHIBITION OF PLANTS.

Mr. Bartlett forwarded for exhibition 12 well grown named English Chrysanthemums imported by him, including the fine lilac "Cido null," the "Gloria mundi" and the pretty pompon "Bob;" also seven new ornamental foliage plants of *Dieffenbachia Bowmanni*, *Croton acubifolia*, *Fittouia Fitchii*, *Maranta Tanden Heaku*, *Gynnostachyum Zeylanicum* and *Pothos* species.

Ten marks were awarded for the latter and six for the former.

In connection with the above, the Secretary mentioned he had received a letter by a recent mail from a member of the Society, Mr. S. Jennings, of which the following is an extract. The letter is dated 14th November.—

"Yesterday I was at the great Chrysanthemum Show at the Royal Horticultural; a very fine display. If you want the purest whites, dazzling in their purity, send for *Blaine*, a large perfect-shaped flower, pointed petals, which stand out straight like a star, six inches in diameter. *Empress of India*, another white beauty, but with petals rounded, and the points curving inwards, more ball-shaped. *Mrs. George Rundle*, a lovely free blooming white chrysanthemum, evidently a favorite. Then among the yellows, from the palest lemon colour, through canary, chrome, golden, orange to deep reddish orange are numbers of wonderful beauties such as *Guernsey nugget*, *Cido null*, *Gloria mundi*, &c. I was also charmed with the pompon varieties, such as *Bob*, *Miss Julie*, &c., perfect in shape, often in clusters, and in profusion of bloom. There was also a plant of *Panda cærulea*, consisting of two heads, having four spikes, each spike of eight and twelve flowers, one of the finest specimens ever exhibited.

For the above contributions and communications, the best thanks of the Society were accorded.

A. H. BLECHYNDEN,

Secretary.

# REPORT

OF THE

## Agricultural and Horticultural Society.

OF

### INDIA.

*Report from the Council to the Society at the Annual General Meeting of 5th February, 1874.*

The Council have to make the following report on the occasion of the present annual meeting:

The progress of the Society during the past year, as regards the election of new Members, is no less satisfactory than it was last year, namely 89 elections against 87 in 1872. The deductions, however, by resignations (49) and by deaths\* (14) are rather in excess of the last year. Seven names have also been removed in consequence of non-response to notices of elections. It has likewise been necessary to withdraw the names of 86 from the list, owing to absence for 3 years and upwards from India, which includes those who have not taken up their membership on their return. It must, however, be borne in mind that these 93 have been nominally kept on the list; they have not contributed to the funds of the Society, nor have they participated in any privileges. The actual number of paying members at the close of the year was 663, or 21 less than in 1872. In addition to the above, the Society now comprizes 33 life Members, 109 absent from India, and 20 Honorary, Asso-

\* Major the Hon'ble W. M. Fraser; Lt.-Genl. Sir E. Huthwaite; the Hon'ble Elphinstone Jackson; Professor Justus Liebig; Mr. J. W. Masters; Dr. J. L. Stewart; Mr. Thornton Warner; Dr. Robert Wight; Mr. A. F. Wilkinson; Mr. Wm. Wilson; Lt.-Col. H. R. Wroughton; Baboo Ramnassur Roy Chowdry; Col. C. Roberts; Lt.-Col. S. C. D. Ryder.

ciate, and Corresponding Members, bringing up the total to 825 as specified in the subjoined classified statement:

Classification.	In 50 previous years.	1871.	1872.	1873.	Gross Total.	Total real No. at the close of 1873 after deducting lapses.
Honorary Members	20	2			22	9
Associate Members	6				6	2
Corresponding Members	11				11	9
Civilians	693	21	11	10	741	192
Merchants and Traders	606	11	10	10	640	123
Agriculturists	596	22	27	19	664	174
Military Officers	639	34	12	15	700	119
Medical Officers	229	8	8	7	252	48
Asiatics	267	16	8	8	299	77
Clergy	39		1	1	41	8
Law Officers	121	4	4	2	131	26
Miscellaneous	137	9	3	17	166	50
	3,367	133	87	89	3,676	825

N. B.—Of these 825 Members, 129 are resident in Calcutta, 589 in the country, and 107 in Europe.

\* In the list of departed Members, the Council have to allude to the names of two for whom they consider a mere silent record would be insufficient, namely Dr Robert Wight, F. R. S., late of the Madras Medical Service, and for some years Superintendent of the Experimental Cotton Farm at Coimbatore; and Mr. J. W. Masters, originally Curator of the Royal Botanic Garden, Calcutta, and subsequently, an Assistant Commissioner in Assam. Dr. Wight was during the greater part of his Indian residence a frequent contributor to the Society's Transactions and Journal. Among other interesting papers may be cited his "suggestions for the better transmission of plants in India;" his practical remarks on the culture and preparation of Senna in the Madras territories;" and his "Notes on Cotton Agriculture as practised in the Government Cotton Farms in Coimbatore." The papers

contributed by Mr. Masters were also varied. His "remarks on the propagation of plants," and on "the food of plants," are especially useful; while his "observations on Tea culture in Assam;" the "Assam Tea plant compared with the Tea plant of China;" and his "list of the most useful timber trees of Upper Assam," are valuable, and were read with considerable interest at the period of publication (30 years ago) when our knowledge of the resources of that important province was so very limited.

The Council regret that the financial position of the Society contrasts unfavourably as compared with past years. Such altered position is not, however, owing to any diminution of the annual receipts or to the legitimate working of the Society, but principally to the unprecedented demands on its resources in connection with the new garden at Alipore. This view of the cause of the present unfavourable aspect of the assets and liabilities of the Society will be confirmed by a reference to the detailed statement of the accounts of the ordinary receipts and disbursements for 1873, as compared with those of the past few years. There is actually no falling off in the annual receipts or any excess in the ordinary disbursements, which latter is conducted as economically as usual. The demand for the necessary expenses for establishing the new garden, and which will for some time to come prove a rather heavy drain on the Society, will be found to be the cause as above noted. The number of paying Members for 1873 being reduced to 21 less than the previous year has caused no material difference in the amount of subscriptions realized, which for 1872 was Rs. 21,581 against Rs. 21,522 this year. The difference of receipts this year being Rs. 800 less as compared with the receipts of 1872, is owing to the accruing of interest on the reduced investment of the funds on Government Securities, which in 1872 yielded Rs. 1,725 against 971 this year. Further, it will be seen that Rs. 10,000 have been diverted from ordinary objects to the purposes of establishing the new garden.

Allusion was made in the last report to the nature of the work carried out in the new garden. During the past year (1873) the Gardener's house has been completed, a large propagating house, and another with bottom-heat arrangements are now in course of completion. Several wells have been dug; an iron gate for main entrance is being manufactured, and a masonry house for the Lurwans has been completed. The laying out of the garden is finished; but the whole is not in so forward a state as could be desired owing to the last hot and rainy seasons having proved so unfavourable for all gardening operations.

Several contributions have been made to the garden during the past year. The Council would especially desire to record their obligations to the following donors:—

Dr. Hooker, C. B., Director of the Royal Botanic Garden, Kew, for two Wardian cases of rare plants.

Mr. J. Horne, Sub-Director of the Royal Botanic Garden, Mauritius, for a collection of sugar-canes.

Dr. George King, Director of the Royal Botanic Garden, Calcutta, for Palms, Orchids, Ferns, and 300 kinds of other plants.

The Superintendent of the Eden Gardens for a general collection of flowering plants.

The President (Mr. Crawford) for several Palms and Ferns, and for a few other ornamental plants and cuttings, &c.

Dr. Fabre Tonnerre, for a collection of Palms, Pandanus, and several ornamental plants.

Mr. T. H. Wordie, for a collection of Orchids, Caladiums, Amaryllis, and a miscellaneous assortment of trees and ornamental plants.

Mr. C. J. Sutherland, for various flowering plants.

Mr. G. W. Bartlett, for seeds and cuttings of ornamental plants.

Mr. W. Stalkart, V. P., for several plants and cuttings.

The Rajah Suttanund Ghosal Bahadur, for cuttings of *Croton masima*, *Terminalia elegans*, and several ornamental trees and shrubs.

Mr. R. Blechynden, for a large number of suckers of *Oycas revoluta*.

Dr. S. C. Mackenzie, for a collection of Lime grafts.

Dr. Sydney Lynch, for the same.

Mr. H. C. Levinge, of Arrah, for an assortment of 230 rooted Rose plants.

The Council would invite further contributions during the current year (1874). They would thankfully receive for the orchard grafts of any superior kinds of fruit trees, as they are desirous of extending this portion of the garden as far as practicable, and to stock it with the best kinds of fruit trees.

The distribution of plants from the Nursery in the Royal Botanic Garden during the past year has been as follows:

Fruit grafts, 1,817, flowering shrubs, 7,125, cuttings of Roses, 3,919, and of other plants, 10,445.

It may here be noted, by way of record, that the connection of the Society with the Royal Botanic Garden will cease at the end of February next, and the distribution will be resumed by the new garden on and after the commencement of the rainy season.

In addition to the very heavy demand for the new garden during the past year, the Council regret to add that the state of the Metcalfe Hall will cause an unusually large item of expenditure during 1874. In consequence of the decay caused by dry rot and white ants, it has been found necessary to replace at least 75 per cent. of the wooden architraves supporting the heavy entablature of the colonade on all sides of the building. This, together with the ordinary thorough repairs, will entail an outlay of

above Rs. 16,000. The Society's proportion of this sum, less the contribution of the Government of Bengal, will amount to about Rs. 6,000.

The amount of the Government donation in aid of the repairs of the Macalfe Hall is Rs 5,000. The Society would take this opportunity of placing on record its best thanks for this liberal aid afforded by the Government of Bengal.

The Council also regret they are unable to give as unqualified a report on the results of last season's consignments of seeds as they were enabled to do in the previous year. Notwithstanding the same mode of packing was adopted, namely in separate tin packages, the out-turn has not been so favourable generally. Taking into consideration the almost unprecedented season of heat and drought through which we have passed, and the fact that so many complaints have been brought to notice of the partial germination, and in some cases total failure, of seeds indented for from various other seedsmen by many persons, members, and non-members, the Council are not prepared to state that the seeds supplied by their own seedsmen in North America and France were radically bad. The complaints having, however, been more numerous than usual, the Council have determined on making some change, experimentally, and to be guided by the results as to future indents.

An exhibition of vegetables and flowers was held in the Town Hall in February, which was considered to be altogether favourable as contrasted with former years. The sum of Rs. 416 was awarded in prizes.

The subject of ten blight of various kinds, as affecting the gardens in Cachar and Assam, has been kept prominently before the Society during the past year, and several particulars, interesting to naturalists, have been published; but no practical information has as yet been elicited towards providing a decided remedy. Though probably the improved system of cultivation, which is now being adopted on some gardens, may tend to modify their destructive effects, it were very desirable, as a question fraught with such importance to the interests of so large a section of our community, that some decided practical action was devised to rid the gardens of the numerous pests, fatal to vegetation, which now abound.

The question of an improved system for the cultivation and curing of Tobacco has also engaged much attention. A Sub-Committee has been appointed by the Society to consider as to the best means of promoting these objects, so that our Indian produce may be able to compete with other countries. The subject has likewise been taken up by the State Department of Agriculture and Commerce. These efforts may, it is anticipated, bear good fruit in due course.

Among other subjects which have been discussed, the Coortagum of Cachar and the oil of sunflower seed may be alluded to.

The report from Dr Forbes Watson, the Reporter on Indian Products, on the former, was such as to induce the Society to request the aid of Government to cause a sufficient quantity to be obtained for a more extended examination. About thirty pounds have been recently received and forwarded to the India Office Museum.

Part I of vol IV of the Journal was published, in October. The materials for another Number are in hand, and this will probably appear in the early part of 1874. The Council record with regret the paucity of papers that have recently been placed at their disposal. They would again urge renewed exertion on the correspondents of the Society to enable them to publish more frequently. It would be satisfactory if the Journal could appear as formerly, at least twice a year, instead of an annual publication.

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*Statement of Receipts and Disbursements of the AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA, from 1st January to 31st December, 1873*

RECEIPTS

From Members—Subscriptions collected during the year	21,522	8	7
Accruals of Interest from Government Securities &c	973	4	0
Proceeds of country vegetable and other seeds	272	15	0
Proceeds of imported potatoes	58	8	0
Proceeds of surplus stock of American and French Vegetable and flower seeds	2,956	0	0
Proceeds of fruit grafts	1,521	6	6
Proceeds of copies of publications of the Society	143	12	0
Members' Amount for pots, boxes packing and forwarding charges for seeds, plants, &c	4,552	7	10
Proceeds of seed cabinets sold	30	0	0
Amount of freight repaid	720	10	0
Amount of suspense account in deposit for appropriation on various accounts	841	1	6
Sale proceeds of <i>Alaucahas</i>	82	0	0
	11,081	12	10
Ordinary Annual Receipts	33,577	9	5

EXTRAORDINARY RECEIPTS

From Proceeds of sale of grass, &c, at the ground at Alipore	55	0	0
Proceeds of sale of Government Securities	10,471	14	11
H. H. the Maharajah of Cashmere for purchase of pea seeds	2,000	0	0
	12,526	14	11
TOTAL RECEIPTS, Rupees	46,104	8	4
Balance in the Bank of Bengal on the 31st December, 1872	2,989	14	9
Balance in hand of Officiating Secretary on 31st December, 1872	50	0	0
	2,989	14	9
GRAND TOTAL, Rupees	49,094	7	1



*Report of the Agricultural*

DISBURSEMENTS.

PURCHASE OF SEEDS.

By Sundry parties for country vegetable seeds, potatoes, &c.	198	2	3
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LIBRARY ACCOUNT.

" Sundry parties for books, &c., purchased	75	0	0
" Duffry for binding books	60	4	0
	<hr/>		
	135	4	0

PRINTING ACCOUNT.

" Messrs. T. Black & Co., for printing letters of calls, money receipts, annual reports, &c., &c.	111	0	0
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JOURNAL ACCOUNT.

" Messrs. T. Black & Co., for printing 750 copies of Journal Vol. 1, Part I., New Series, including proportion of Mr. J. Schaumburg's bill for drawing illustrations to B. C.'s paper on the Tea Bug of Assam	1,187	0	3
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SENDRY PUBLICATION ACCOUNT.

" Messrs. T. Black & Co., for reprinting 300 copies of Jacobson's hand-book on the cultivation and manufacture of Tea	158	0	0
" Messrs. T. Black & Co., 150 copies Col. Shelley's paper on Indian Gardening	82	3	9
" Messrs. T. Black & Co., 250 copies Mr. Piel's paper on the Tea Bug of Assam, including proportion of Mr. Schaumburg's bill for drawing illustrations	150	4	0
" Messrs. T. Black & Co., 50 copies of analytical key	2	0	0
	<hr/>		
	392	7	9

NURSERY ACCOUNT.

" Establishment from December, 1872, to November, 1873	1,088	13	3
" Purchase of fruit grafts, seedlings, pots, boxes, Wardian cases, including dinky and cooly hire	1,542	8	3
	<hr/>		
	2,631	5	6

ESTABLISHMENT ACCOUNT.

Office Establishment from December, 1872, to November, 1873	11,611	0	0
Carried over ...	<hr/>		
	16,266	3	9

# and Horticultural Society of India

1212

Brought forward 16,266 3 9

## ADVERTISEMENT ACCOUNT

By Advertising notices of meeting,  
seeds for distribution and  
sale &c 167 6 6

## FREIGHT ACCOUNT

„ Freights paid on boxes of seeds  
from Melbourne 20 0 0  
And on packages of seeds, plants,  
&c, sent to members 906 0 7  

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926 0 7

## MUNICIPAL HALL ACCOUNT

„ Proportion of house police and  
lighting rates from October,  
1872 to September 1, 1873  
and water rate to December,  
1873 607 8 0

## STATIONERY ACCOUNT

„ Sundry parties for stationery 73 7 3

## RECORD ACCOUNT

„ Sundry parties for balance of ac-  
counts refunded 228 10 0

## HORTICULTURAL SHOW

„ Advertising printing and sun-  
dry petty expenses incurred 185 11 6  
„ Sundry parties for pecuniary re-  
wards 116 0 0  

---

601 11 6

## SEED CABINET ACCOUNT

„ Payments on this account 30 0 0

## POTATO ACCOUNT

„ Freight advertising, and other  
charges on potatoes imported  
from Messrs J. & C. Carter &  
Co 100 3 6

## PETTY CHARGES ACCOUNT

„ Postage on letters, Journals, &c,  
sent and received 21 12 2  
„ Bank of Bengal commission, on  
Interest drawn and Broker-  
age for Govt Securities sold 45 7 10  
„ Pankajwallahs pensions, back-  
ery and cooly hire extra  
packmen, landing and for-  
warding charges cost of wax  
cloth sealing wax, &c, &c 451 10 0  

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716 14 0

Total Ordinary Expense, Rupees 19,718 1 1

ix.

*Report of the Agricultural*

Brought forward 19,718 1 1

CAPITAL ACCOUNT

By Messrs Mackintosh Burn & Co,

balance for building Garden

er's House

10 000 0 0

" Sundry parties for building cook

room godowns &c

789 14 0

10,789 14 0

NEW GARDEN ACCOUNT

" Cost for building

plant house Dur

wan's house and

cooling shed

1 235 11 3

" Cost for making

roads and 2

wells

3 507 8 9

" Purchase of plants

to be put in k

erry and c ly

hire &c &c

2 323 6 0

" Cost of procuring

house under con

struction

1 510 7 9

8 576 12 9

" Passage money and

Gratuity to Mr

Head the Gar

dener under the

agreement

994 15 0

" Additional Gratui

ties in excess of

agreement in

cluding carriage

hire

199 2 3

" Loan to Gardener

to be repaid

371 0 0

" Salary of Gardener

including rent of

house

1 950 0 0

3 808 1 3

" Wages of native Es

tablishment of

malles, coolies,

&c, &c

2 731 7 9

15 116 5 9

Total Extraordinary Expense Rupees

25 906 3 9

Total Expenditure, Rupees

45,624 4 10

Balance in the Bank of Bengal on

31st December 1873

3 466 4 6

Ditto in hand of Secretary on do

3 13 9

3,470 2 3

GRAND TOTAL, Rupees

48,094 7 1

# MEMORANDUM.

## DISBURSEMENTS.

To amount of Ordinary Disbursements during the year 1873 as per statement	10,718	1	1
" " paid balance for Gardener's house built, and for building Godowns, Cook-room, &c.	10,789	14	0
" " paid on account of the New Garden	15,116	5	9
" Balance in the Bank of Bengal on 31st December, 1873	45,624	4	10
" Balance in hand of Secretary, on 31st December, 1873	3,468	4	6
" " " " " "	3	13	9
Total, Rupees	84,700	2	3
	49,004	7	1

## LIABILITIES.

Messrs D Landreth & Son, for Balance for 1872, and Seeds supplied in 1874, £ 382, or Rupees	5,820	0	0
" Vilmorin, Andreux & Co., for Seeds supplied in 1874, £ 325, or say, Rs	3,250	0	0
" Low, Sommer & Co., for Field Seeds, £ 38 or say, Rs	380	0	0
" Jas. Carter & Co., for potatoes, £ 24, or Rs	240	0	0
H. H. The Maharajah of C. Chumre Messrs H. S. King & Co., for books and periodicals, £ 21, or say, Rs	210	0	0
Proportion for Society's share of Messrs. Burn & Co.'s Estimation for repairs to the Metal's Hall.	5,250	0	0
Messrs. W. Bull & Co., for plants, £ 38, or say Rupees	380	0	0
Conthard & Co., for Lawn Mowers	154	6	2
Thos. Hill, Esq., Freight and Charges on plants, £ 15, or say, Rs	15	0	0
Messrs. Lickenden & Co., for 2 Iron Gates ordered	200	0	0
Petty Outgoing bills for sundry purchases on account of the New Garden at Allipore, say	250	0	0
Total, Rupees, say	13,149	6	2

## RECEIPTS.

By amount of Ordinary Receipts during the year 1873, as per statement	83,457	9	5
" amount of extraordinary receipts during do.	12,526	14	11
" Balance in the Bank of Bengal on 31st December, 1872	45,104	8	4
" do. In hand of officiating Secretary on 31st December, 1872	2,989	14	9
" " " " " "	50	0	0
Total, Rupees	49,094	2	1

## ASSETS.

Inverted Capital—In Government Securities lodged in Bank of Bengal	10,133	5	3
Society's proportion cost of erecting the Metal's Hall	23,557	15	9
In landed property, including building at Allipore	20,648	6	0
Amount of Cash Balance	3,470	2	3
Balance of Subscription &c, due from Members from Years 1863 to 1873, as follows, viz.:	1,076	12	6
Balance of Subscription	144	14	3
" of seeds, grafts, Journals, freight, &c.	1,921	10	9

Total Rupees .. 69,629 8 0



**RULES FOR THE GARDEN**

**Agricultural and Horticultural Society of India,  
ALIPORE.**

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1 All communications seeking botanical or other information or on any particulars relating to the garden, are to be addressed and sent direct to the Secretary, Metcalfe Hall.

2 The Gardener is strictly interdicted from receiving any letters for the Secretary. All letters are to be sent or posted by the writers direct to the Metcalfe Hall, Calcutta.

3 All applications for ornamental plants, fruit grafts, cuttings, seeds, &c., are to be addressed direct to the Secretary.

4 No ornamental plants, grafts, or seedlings of fruit tree, seeds, cuttings, fruit, vegetable, cut flowers, or other property of the Society are to be distributed or delivered from the garden without the special written authority of the Secretary or his Deputy.

5 All payments for the purchase of fruit seedlings and grafts, charges for pots, boxes, &c., &c., are to be made direct to the Office of the Secretary, Metcalfe Hall, Calcutta.

6 The Gardener has no authority to treat or deal for the sale, purchase, transfer, or exchange of any plants, grafts, boxes, pots or other property on behalf of the Society, without the special written authority of the Secretary or his Deputy.

7 All letters from Members or others intended for the Secretary, wrongly addressed to the Gardener on any subject whatsoever relating to the garden, or the affairs of the Society, to be returned by the Gardener to the writers under blank cover, with printed copy of this paper.

8 Copies of this paper in large print to be kept posted daily at the garden entrance and in different and most conspicuous places in the garden grounds, plant-houses, &c.

9 Visitors are particularly requested not to break flowers, or cut or break branches, twigs, or leaves of any plants, and to keep on the gravel walks.

By order of the Garden Committee,

A. H. BLECHYNDEN,

*Secretary.*

METCALFE HALL;  
Calcutta, 12th May, 1874. }



## Appendix.

### ON THE MANAGEMENT OF ROSES.

*Extracts from a paper by Mr. J. B. Stirling which appeared in the Society's Journal, Vol. II., Part 1, N. 8, and also of a letter from Mr. Swinhoe on the propagation of choice varieties of Roses which appeared in the Proceedings of the Society for November, 1872.*

In the open ground the situation selected for the plants should, by all means, be well drained, allowing water at no time to stagnate around the roots. Rich soil, using decayed manure mixed with it, when obtainable, and when not, a top-dressing of bone dust or oil cake, is very essential; as a rule, strong growers partaking more liberally of the stimulus than moderate ones. Planting on raised mounds should be avoided, as also in hollows, when the object is not to irrigate. A liberal supply of water, when the plants are growing and blooming, should not be neglected even for a day. When planting first, it is not sufficient digging a hole and placing therein the plant, the soil also should be firmly pressed with the feet, which will enable the roots to readier grasp the soil.

Pot culture is the favourite mode existing in many and specially in Native gardens. Little more need be said than that the soil wherein Roses are grown should, if possible, be frequently renewed and the plants, when necessary, shifted into a larger size of pot. Soil should be the best obtainable, and water should be more frequently applied than when growing in borders.

Pruning has a decided influence on the after-welfare of the plant, and is entered upon in more detail at the head of the various sections. Dead wood should be removed as it appears, as also the wild growth and shoots running into the centre of the plants, so as to allow the air to circulate freely throughout. A constant removal of the sucker from stocks as they appear should be upheld, and this will secure to the variety the necessary sustenance. After the rains are well over, is the proper time for a systematic pruning, although the operation on a less extended scale may be carried on at any time. At the commencement of the cold season established plants will be the better of an application of manure, and the soil dug about their roots. Staking the plants as they advance in growth is very proper, and gives a finish to the whole.

Roses like sunshine, and do not, generally speaking, acquire vigour under the shade of trees; indeed, some trees are most



pernicious. Decayed flowers should be removed as they appear, and when the buds seem too many in the bunch, they may be judiciously cut out. Such will result in a prolonged blooming season and increase the size of the flowers.

Propagation by cuttings is that most generally known, and with many of the varieties is of easy manipulation. The best possible choice is that obtained from a well ripened shoot, not much thicker than a pencil, having a heel of the older wood attached, the length consisting of four and five joints. The portions of shoot above this again in like lengths can be utilized to advantage. When cuttings of two or even one joint-length are used, it is immaterial from what part of the shoot they are taken, so long as there is no superabundance of pith. The two lower leaves, when the first process is adopted, should be cut away close to the bud, and the upper ones allowed to remain entire. When only two buds, the cutting should be transversely cut, clean under the lower, and slantingly a little above the upper bud, the entire leaf of the upper only allowed to remain. Cuttings of one bud are cut between the internodes, with leaf attached.

The buds on the shoot should appear the size of pinheads, and in no way started. Naked shoots can be used, cut into lengths as described, but these doing well under any bush in the rains, are longer in coming away under glass. Layering may be described as cuttings, semi-attached to the parent plants, and is well known to all *nullees*.

A successful mode of the one bud system is to make them in the form of vine cuttings, split in length, leaving the bud and leaflets entire; the roots will protrude from all the portions which the knife has operated upon, and the future plant thus originating from the bud will acquire greater vigour in less time than a cutting in the ordinary way.

White sand is the best medium wherein to place the cuttings, and should, if possible, have a bell glass or an inverted tumbler covering till they get rooted, which will be in a month or six weeks. Cuttings can be operated upon at all seasons with glass covering. A common and often successful practice by *nullees* is in operation during the rains by placing their cuttings in common soil under any shady bush. From this stage, when ready, they should have quick removal into small pots of soil; from these again into larger pots, or to the situation where they are finally to remain.

In inarching, we require a strong rooted cutting of some strong grower, the best being *Rosa multiflora*, or even a seedling, called a stock, in a pot; the bark and a portion of the wood at a place where the junction is intended to be is removed with a sharp cut, say three inches in length, and not deeper than half the thickness of the stock; a corresponding process is gone through with the shoot of the variety called the scion, and both are united and firmly bandaged in their place. The union is speedily

effected, after which the severance may be made. Grafting is performed in a variety of ways, and differs in substance only from the last in the scion being severed at the time of operation. It also requires the appliance of wax or clay to exclude air for a time from the parts operated upon. During the rains this becomes a sure way in dealing with obstinate kinds.

Budding is the prolific source of nearly all imported kinds, and is applicable with us only during the cold and rainy season. In dealing with this, it is of the first importance to know that the bark of the stock, when penetrated, can be easily separated from the wood, then the buds of the scion should be plump and not altogether invisible. The stock is the first operated upon, first with a sharp knife specially made for the purpose, called a budding knife. Make a cut through across the bark of the shoot, then a slit along the shoot, three-quarter inch or more, so as to form on the shoot the letter T. The ivory blade of the knife is now applied into and under the incisions, and the bark loosened gradually from the wood. It is now ready to receive the bud of the scion. The shoot is held in the left hand, and half an inch above the bud; the knife is entered slantingly towards the centre, passed the bud itself, then out half an inch below the bud. The wood which will remain with the bud should not be removed, as is the erroneous usage of the country, but the whole entered in the incision of the stock already prepared. It now only requires binding, for which jute fibre answers admirably.

Following is copy of Mr. Swanhoe's letter:

"Nearly all the roses which were issued out by the Agricultural and Horticultural Society during the time that Mr. Sterling was employed on the Society's account by the Royal Botanical Gardens, were raised from cuttings containing two or three buds under glass, but not in leaf mould and sand, but only sand. The mode to be adopted for raising these cuttings, is make first a long narrow bed of white river-sand, fine sand, and not salt or gritty. The sand to be about eight or nine inches deep. Construct a roofing of thatch to protect from sun which will lift up to let in light, but to guard off sun. Place cuttings in small pots, the smaller the better, close to the rim of the pots, and as close as you please. Bury the pots up to the rims in the sand beds, and place bell glasses over them, the glasses to be kept over cuttings during the day, but to be lifted off at night. In this mode all Mr. Sterling's cuttings were raised, and this succeeded throughout the year excepting in April, May, and June, when the cuttings formed only the callus, but afterwards failed. If bottom heat were secured by placing under the sand tanning and plunging the pots into tannings after the callus was formed, you could secure success for every cutting. In the mode above described, Mr. Sterling says, he has known even one single bud buried in the sand to succeed, cut the same as if it were to be budded. The best time for striking cuttings, is undoubtedly the first two

months of cold weather, namely December and January, and for budding and for working the Rose in every way.

### LIST OF ROSES

from which cuttings will be available to members on and after the 1st of July, 1874. This mark \* denotes varieties, of which a few rooted-plants will be available.

*Members desirous of obtaining any particular kind or variety of, instead of a general assortment, need only quote in their requisition the No. affixed to the kind required, and in every instance state whether rooted plants, or cuttings only are required.*

1	* Alfred Colomb.	35	Duc de Magenta.
2	Abel Grand.	36	* Docteur Marx
3	Antoine Ducher.	37	Duchesse de Nemours.
4	Andre Fresnoy.	38	* Elizabeth Plantier.
5	Acidalie.	39	Eugenie Goehis
6	Aristide Dupuis	40	Fellenburg
7	* Adelaide Fountain.	41	Gloire de Santenay.
8	Abdel Kadir	42	Gabriel de Peyronny.
9	* Abbe Berbye.	43	* Great Western.
10	Achille Gonod.	44	Gloire de Dijon.
11	Alfred de Rougemont.	45	Giant des Batailles.
12	Abriçoté.	46	Gloire de Banx
13	* Baronne Pelletan de Kenkeleu.	47	Général Jacqueminot.
14	* Baron Adolphe de Roths- child.	48	John Keynes
15	* Belle de Massifs	49	* Jacques Laffette.
16	* Blauri No. 2.	50	Jean Gonjon.
17	* Belle Chartronaisse	51	Jules Margottin.
18	Baronne Houssemann	52	L'Enfant du Mont-Car- mel
19	Bernard Palissy	53	Louis 14th
20	Boule de Nieve.	54	* Lord Raglan
21	Baronne Prévost.	55	* Le Rhone.
22	Belle Marguerite.	56	* L. Avenir.
23	Comtesse Chahrillant.	57	Louise Margottin.
24	Charles Rouillard.	58	Louis Philippe.
25	Comtesse Turenne.	59	Lord Herbert
26	Celine Forestier.	60	La Ville de St. Denis.
27	* Cardinal Pattizze.	61	Le Pactole.
28	Chenedole.	62	Louise de Savoie.
29	Comte de Paris.	63	Lady Canning.
30	Coquette des Alpes.	64	La Portorille.
31	Cloth of Gold.	65	L'Enfant trouvé.
32	Charles Lawson.	66	Lady Emily Peel.
33	Duc de Nemours.	67	* Menoux.
34	Docteur Andry.	68	Madame Rival.
		69	* Madame Alice Dureau.

### NOTE.

Members applying for Ornamental Plants, or Roses, or both, need only quote the "No." affixed to the kind required, taking care in the list to distinguish "Roses" from "Plants," by quoting the words immediately over the Nos.



# *List of Roses.*

70	Madame Eugene Appert.	94	Princess Mathilde.
71	Madame Donage	95	Prince Camille de Ro-
72	Madame Derraux Douville.		han.
73	Madame Laffay.	96	* Reine des Violettes.
74	Madlle. Bonnaire.	97	Rivers George 4th.
75	Mademoiselle Eugenio	98	Rev. H. Dombrein.
	Verdier.	99	* Souvenir de Docteur.
76	* Madame Boutin.	100	Souvenir de Poileau.
77	Mademoiselle Mari Radi.	101	" de Charles
78	Madame Clemence Joig-		Moulant.
	neaux.	102	Semin St. Juin.
79	Madame LaMark.	103	Souvenir de Comte Ca-
80	Madame Wm. Paul.		vour.
81	Madame Brave.	104	Sulphurea or old Yellow.
82	Madame Bocilia.	105	Souvenir de la Reine
83	Madame Cambaceres.		Angleterre.
84	* Mous. Reveil.	106	Saferons.
85	Madame Victor Verdier.	107	Solfaterra.
86	Madame Vidot	108	Triomphe des Francais.
87	Marcehal Vaillant	109	* Triomphe de Caen.
87	Marcehal Niel.	110	Vanqueur de Goliath.
88	Oliver Delhomme.	111	Vioice
89	* Pie Nona	112	Vicomtesse Vazius.
90	Pitard	113	William Jesse
91	* Paul Verdier	114	William Griffiths.
92	Prince Imperial	115	Xavier
93	* Prince Eugene Beau-		
	harnois.		

## *List of Plants available in the Garden of the Agricultural and Horticultural Society of India, for the Season of 1874-75.*

New and rare plants marked.\*  
Plants with ornamental foliage marked.†  
Bulbous and tuberous-rooted plants marked.‡  
Fruits, Climbers, Ferns, Palms, and Orchids, marked in full.  
[The Garden having been so recently established, some of these plants may not be available this season, and others to a limited extent.]

A. The letter A denotes plants that require some care to get them to strike root.

B. Denotes plants that will only strike root in sand beds under glass.

C. Denotes plants that seed freely for raising plants.

D. Signifies plants easily propagated by cuttings.

E. Signifies plants propagated by layers:

F. Signifies by grafting or inarching.

G. Signifies by divisions of bulbs, tubers, &c.

H. Signifies by division of roots or suckers,

## Colours of Flowers distinguished by the following letters: •

Bo. Blue.	Pk. Pink.
Br. Brown.	Rd. Red.
Cn. Crimson.	St. Scarlet.
Fh. Flesh colour.	Va. Variegated.
Gn. Green.	Vt. Violet.
Lc. Lilac.	We. White
Oc. Orange.	and
Pe. Purple.	Yw. Yellow.

## Gen. Sp.

- 1 Abroma.
- 1 " fastuosa. C. Cn.
- 2 Abutilon.
- 1 " marmoratum. D. Pk.
- 2 " striatum. D. Va.
- 3 " Thompsoni.\* † D. Va.
- 3 Acacia
- 1 " Arabica. G. Yw.
- 2 " glauca. G. Yw.
- 3 " Farnesiana. G. Yw.
- 4 " sirissa. G. Yw.
- 4 Acalypha.
- 1 " colorata. D. St.
- 2 " densiflora. † D. St.
- 3 " glabrata (Syn tricolor) † D.
- 4 " tricolor marginata. † D.
- 5 Acanthus
- 1 " ilicifolius. D.
- 2 " leucostachyus D. Lc.
- 6 Achras. (Fruit)
- 1 " Sapota (Fruit Sapota.) F.
- 7 Achimenes. ¶
- 1 " Ambroise Verschaffelt D. G.
- 2 " cherub \* D. G.
- 3 " dazzle.\* D. G.
- 4 " diamond.\* D. G.
- 5 " eclipse.\* D. G.
- 6 " estella.\* D. G.
- 7 " excelsior.\* D. G.
- 8 " grandiflora. D. G.
- 9 " grandis.\* D. G.
- 10 " Gorgiana.\* D. G.
- 11 " Leopard.\* D. G.
- 12 " longiflora. D. G.
- 13 " masterpiece.\* D. G.
- 14 " Marole.\* D. G.
- 15 " Oberon.\* D. G.
- 16 " Pink perfection.\* D. G.

Gen.	Sp.		
17	Achimenes.	Rose-Queen.*	D. G.
18	"	tubiflora.	D. G.
19	"	Williamsii*	D. G.
8	Adonnanthera.		
1	"	pavoniana.	G. Yw
9	Adiantum	(Fern.)	
1	"	Cappillus veneris.	H.
2	"	caudatum.	H.
3	"	Farleyense*	H.
4	"	fulvum.*	H.
10	Adhatoda.		
1	"	vasica.	G D. Va.
11	Ægle		
1	"	marmelos (Fruit Bel.)	G.
12	Ærides.		
1	"	odorata (Orchid.)	
13	Ærua.		
1	"	sanguinolenta.†	D
14	Agati.		
1	"	grandiflorum.	G. Rd.
2	"	albiflorum	G We
3	Agati.	coccineum.	G Gn.
15	Agave.		
1	"	Americana.	H.
2	"	variegata	H.
3	"	bulbosa.	H.
16	Aglaia.		
1	"	odorata	B Yw.
17	Aglaonema.†		
1	"	crommutatum.	H.
18	Allamanda.		
1	"	Anbletii.	A. B
2	"	cathartica	B.
3	"	nerifolia	B. G.
4	"	Schotei.	B.
19	Alocasia.¶†		
1	"	argyoneura	G.
2	"	Jenningsii.	F.
3	"	macrorrhiza variegata.*	G. H.
4	"	metrlica.*	G. H.
5	"	Sikimensis.	G
6	"	zebrina.*	G. H.
20	Aloc.		
1	"	barbatus	H.
2	"	saponaria.	H.
21	Aloysia.		
1	"	citriodora.	D.



8 *Plants available in the Garden of the*

Gen.	Sp.	
22		<i>Alpinia.</i>
	1	„ <i>allinghami</i> . G. Dk.
	2	„ <i>calcarata</i> . G. Br. Pe.
	3	„ <i>nutans</i> . G. We. Pk. Oc.
23		<i>Alternanthera</i> .†
	1	„ <i>amabilis</i> * D.
	2	„ <i>discolor</i> * D.
	3	„ <i>paronychoides</i> * D.
	4	„ <i>spathulata</i> D.
24		<i>Amherstia.</i>
	1	„ <i>nobilis</i> . E. Rd. Yw.
25		<i>Annoora.</i>
	1	„ <i>Rohitaka</i> . E. We.
26		<i>Ancilema</i>
	1	„ <i>nudiflora</i> . H. Be.
27		<i>Angelonia.</i>
	1	„ <i>grandiflora</i> D. Le.
28		<i>Anona</i> , (fruit) Custard Apple. C.
	1	„ <i>reticulata</i> (Nona) C.
	2	„ <i>squamosa</i> (Ata) C.
29		<i>Anthericum.</i>
	1	„ <i>vesperlinum</i> . We.
30		<i>Anthurium</i> .†
	1	„ <i>magnificum</i> * H.
	2	„ <i>miquelianum</i> * H.
	3	„ <i>pedato radiatum</i> * H.
	4	„ <i>tetragonum</i> * H.
	5	„ <i>Wildenovi</i> * H.
	6	„ <i>longifolium</i> H.
31		<i>Antigonon</i> (Climbers.)
	1	„ <i>leptopus</i> G. Pk.
32		<i>Aphelandra.</i>
	1	„ <i>cristata</i> . D. Oc.
	2	„ <i>fulgens</i> . D. St.
33		<i>Aralia</i> .†
	1	„ <i>digitata</i> . D.
	2	„ <i>Guilfoylei</i> * D.
	3	„ <i>papyrifera</i> . H.
34		<i>Araucaria.</i>
	1	„ <i>Bidwelli</i> . C.
	2	„ <i>Cookii</i> C.
	3	„ <i>Cunninghami</i> C.
	4	„ <i>excelsa</i> . C.
	5	„ <i>glauca</i> . C.
35		<i>Ardisia.</i>
	1	„ <i>solanacea</i> . C. } We.
	2	„ <i>umbellata</i> . C. }

Gen.	Sp.	
36		<i>Areca</i> (Palm)
	1	disticha.
	2	gracilis.
	3	horrida.
	4	Madagascariensis.
	5	Oleracea.
	6	Sp. (Andamans.)
	7	triandra.
37		<i>Arenga</i> (Palm.)
	1	obtusifolia.
	2	Sp.
38		<i>Argyrea</i> (Climber.)
	1	cuneata. C. D.
	2	speciosa C. Gn.
	3	splendens. C. Rd.
39		<i>Aristolochia</i> (Climber.)
	1	Braziliensis. E. Vd.
	2	labiosa. E.
40		<i>Artabotrys</i> .
	1	odoratissima. C. Gn.
41		<i>Arthrostemma</i> .
	1	lineatum. B. We.
42		<i>Artocarpus</i> .
	1	incisus (Bread fruit.) H. C.
	2	Lacoocha. H. C.
43		<i>Arum</i> .¶
	1	pictum. G.
44		<i>Arundo</i> .†
	1	donax. H. B.
	2	variegata. H. B.
45		<i>Asparagus</i> (Climber.)
	1	acerosus. C. We.
	2	racemosus. C.
46		<i>Aspidistra</i> .†
	1	punctata. H.
47		<i>Asplenium</i> (Fern.)
	1	dentatum. H.
	2	esculentum. H.
	3	Nidus avis. C.
	4	Sp.
48		<i>Asystasia</i> .
	1	chelonioides. D. Lc.
	2	Coromandeliana. D. Pe.
	3	formosa. D. St.
49		<i>Averrhoa</i> (Fruit.)
	1	caranibola (Kumruna.) C.

Gen.	Sp.	
50	Bambusa.	
	1	arthiophylla. H. C.
	2	aurea variegata (Maximowiczii)* H.
	3	Balcona. H. C.
	4	gigantea. H.
	5	stricta. H. C.
51	Banisteria (Climber.)	
	1	laurifolia. E. Yw.
52	Barleria.	
	1	cœrulea. D. C. Lc.
	2	ciliata. D. C. Rd.
	3	cristata. D. C. Lc.
	4	dichotoma. D. C. We.
	5	Gibsoni. D. C. Lk.
	6	lupulina. D. C. Oc.
	7	prionitis. D. C. Yw.
	8	rosea. D. G. Pc.
53	Barringtonia.	
	1	racemosa. C. E. Rd.
54	Bauhinia.	
	1	acuminata. C. We.
	2	purpurea. C. Pe.
55	Beaumontia (Climber.)	
	1	grandiflora. A. C. We.
56	Begonia.¶	
	1	argyrostigma.† B.
	2	Anacreon.* B.
	3	Caroline.* B.
	4	climax.* B.
	5	dazzle.* B.
	6	ensign.*
	7	gem.*
	8	glitter.*
	9	Hermine.*
	10	hybrida.
	11	hydrocotylifolia.
	12	Lothair.*
	13	lucida.*
	14	magnet.*
	15	reniformis.†
	16	Trojan.*
57	Bignonia (Climber.)	
	1	Chamberlaynii. A. C.
	2	gracilis. B.
	3	grandiflora. C.
	4	macaranata. C.
	5	Indica. C.
	6	labrosa. C.

All easily propagated  
by cuttings, many  
by leaves and seed.

Gen.	Sp.	
7	Bignonia.	picta* B.
8	"	Roziana* B.
9	"	venusta.
10	"	Sp.
58	Bilbergia.	
1	"	Melanthera. H. St.
59	Biota.	
1	"	Orientalis Aurca. A.
60	Bixa.	
1	"	Orellana. C. Fh.
61	Blichia (Fruit.)	
1	"	Sapida. C.
62	Bohmeria.	
1	"	Nivea (Rhea.) D.
2	"	Sp. D.
63	Bombax.	
1	"	pentendra. C.
64	Bougainvillia.	
1	"	glabra. B. E. Po.
2	"	spectabilis. A. E. Gn.
65	Buxus.	
1	"	Sp. C.
66	Bromelia.	
1	"	Sp.
67	Brownea.	
1	"	antigniensis.* C. E.
2	"	Ariza. C. E. St.
3	"	coccinea. C. E. St.
4	"	grandiceps. C. E. St.
68	Brugmansia.	
1	"	suaveolens. B. We.
69	Bryophyllum.	
1	"	Sp. D.
2	"	Sp. D.
70	Buddlea.	
1	"	Lindleyana. B. Lc.
2	"	neemda. G. We.
71	Cacalia	
1	"	carnosa. D. We.
72	Cæsalpina	
1	"	coriaria C. H. We.
2	"	Grahami. C. H. Oc.
3	"	paniculata. C. H. Yw.

Gen.	Sp.		
73		Caladium.†	
	1	amabilis.	
	2	Auguste Riviere.*	
	3	argyrophyllum.	
	4	Barillet.*	
	5	bicolor.*	
	6	Cannærtii.*	
	7	Chantinii.	
	8	Dr. Lindlay.*	
	9	Duc de Nassau.*	
	10	Duc de Ratisbon.*	
	11	E. G. Henderson.*	
	12	Houlletii.*	
	13	Jules Patzeys.*	
	14	Lepeschkinci.*	
	15	Louise Poirier.*	
	16	Marmoratum.	
	17	Max kolb.*	
	18	Marabile.	
	19	Mrs. Dombpain.*	
	20	Marillo.*	
	21	Napoleon III.*	
	22	Prince Albert Edward *	
	23	Princess Alexandra *	
	24	Princess of Teck* (golden.)	
	25	Rogale.*	
	26	Reine Victoria.*	
	27	Schmidtzii.*	
	28	striatum.*	
	29	Caladium. Verschaffetti.	} G.
	30	Wightii.	
74		Calamus (Palm.)	
	1	sp. Ceylon.	} C.
	2	sp. Java.	
	3	sp. Malacca.	
75.		Calotropis.	
	1	gigantea. C. H. Lc.	
76		Calophyllum.	
	1	inophyllum. H. We.	
77		Camphora.	
	1	officinalis. C. Yw.	
78		Canna.†	
	1	Annei discolor.* Oe.	
	2	Auguste Ferrier.* St.	
	3	Bonnetti. St.	
	4	semperflorens.* St.	
	5	Bergiana.* St.	

Gen.	Sp.		
	6	<i>Canna</i>	<i>Bicolor</i> de Java.* St.
	7	"	<i>Bihoreli</i> .* St.
	8	"	<i>Caledoniensis</i> .* . .
	9	"	<i>Chantini</i> .* Oe.
	10	"	<i>Daniel Hooibrenk</i> .*
	11	"	<i>discolor floribunda</i> .* . St. . .
	12	"	<i>elegantissima</i> . St.
	13	"	<i>erecta hybrida</i> .* Vt.
	14	"	<i>expansa</i> .* St.
	15	"	<i>Ferrandii</i> .* H. Str.
	16	"	<i>Fintelmanni</i> .*
	17	"	<i>glauca</i> .* Vt.
	18	"	<i>geant</i> .* Oe.
	19	"	<i>limbata</i> .* Rd.
	20	"	<i>Marchal Vaillant</i> .* Oe.
	21	"	<i>maxima</i> .* Vt.
	22	"	<i>metaloides</i> .* St.
	23	"	<i>metalica</i> .* St.
	24	"	<i>nigricans</i> .* St.
	25	"	<i>Premice de Nice</i> .* Yw.
	26	"	<i>Van Houttei</i> .* St.
	27	"	<i>vitata</i> .* Oe.
	28	"	<i>zebrina coccinea</i> .* St.
79		<i>Carissa</i> *(Frut)	
	1	"	<i>carandas</i> (Kurumcha)
	2	"	<i>grandiflora</i> .*
80		<i>Caryota</i> . (Palm).	
	1	"	<i>obtusifolia</i> .
	2	"	<i>sobolifera</i> .
	3	"	<i>ureus</i> .
81		<i>Cassia</i> .	
	1	"	<i>Australis</i> . Yw.
	2	"	<i>alata</i> . H. Oe.
	3	"	<i>auriculata</i> . Yw.
	4	"	<i>marginata</i> . Rd.
	5	"	<i>tomentosa</i> . Yw.
82		<i>Castenospermum</i> . (Morton bay chesnut)	
	1	"	<i>Australis</i> C.
83		<i>Castus</i> .	
	1	"	<i>speciosus</i> .
84		<i>Catesbaea</i> .	
	1	"	<i>spinosa</i> . D. Gn.
85		<i>Cathartocarpus</i> .	
	1	"	<i>fistula</i> . C. Yw.
86		<i>Celastrus</i> .	
	1	"	<i>Sp.</i> C.
87		<i>Centradenia</i> .	
	1	"	<i>rosea</i> . B. Pk.

14. *Plants available in the Garden of the*

Gen.	Sp.		
88	1	Cerbera.	
		" fruticosa.	C. Rd.
89	1	Cereus.	
	1	" Binplandii.	C.
	2	" Macdonaldæ.	C.
	3	" grandiflora.	C.
	4	" tetragonum.	C.
90	1	Chamærops (Palm)	
		" Fortunii.	C.
91	1	Chendrospermum.	
	1	" dentatum.	B.
92	1	Chrysobalanus.	
	1	" Icoca.	A. C.
93	1	Chrysanthemum.	
	1	" aurea multiflora.	Yw.
	2	" Countess Granville.	We.
	3	" Empress of India.	D. H. We.
	4	" General Slade.	Br.
	5	" Guernsey Nugget.	Yw.
	6	" Isabella Bott.	We.
	7	" Orange Annie Salter.	Oc.
94	1	Chrysophyllum. (Fruit)	Star apple.
	1	" Cainito.	E.
95	1	Cinamonum, (cinnamon)	
	1	" Zeylanicum.	C.
96	1	Cissus. Climber	
	1	" argenteus.	} B.
	2	" Binplandi.	
	3	" discolor.	
	4	" quadrangularis.	
97	1	Citrus. (Fruit)	
	1	" Auranteum (orange)	China from Lucknow.)
	2	" "	(Malta from do. do.)
	3	" "	(do. round do. do.)
	4	" "	(Nagpore with large leaves.)
	5	" "	(do. do. small leaves.)
	6	" "	(Paiebag do.)
	7	" "	(Roola do.)
	8	" "	(Sylhet do.)
	9	" Acid Serbotty lime.	
	10	" "	Gorrah line.
	11	" "	Kagujee line.
	12	" Acida Patee (Lime.)	
	13	" Decumara. (Pomelo.)	
	14	" "	Pink fruited, ditto.
	15	" "	Red " ditto.
	16	" "	White " ditto.

D. E. F.

Gen.	Sp.		
17	Citrus.	Limonum (Lemon.)	} D. E. F.
18	"	" Malta (From Lucknow.)	
19	"	" Sweet (do. do.)	
98	Clematis	(Climber.)	
1	"	Gouriana. H. We.	
99	Glerodendron.		
1	"	fragrans. D. We.	
2	"	Kæmpferi. D. St.	
3	"	Indicum. C. We.	
4	"	nutans. D. We.	
5	"	odoratum. D. Lc.	
6	"	speciosum (Climber.)*	D. Gn.
7	"	Thompsonii (Climber.)	D. We. Gn.
100	Clovia.		
1	"	Gardeni. H. Oo.	
2	"	nobilis.* H. Oo. Gn.	
101	Clitoria	(Climber)	
1	"	ternatca. C. Vt.	
2	"	alba. C. Wo.	
3	"	palida. C. Be.	
102	Cochlospermum.		
1	"	gossypium. C. Yw.	
103.	Cocoloba.		
1	"	platyclada. D.	
104.	Coffea.		
1	"	Arabica.	} C. We.
2	"	Bengalensis.	
3	"	Liberian.*	
105	Coleus.		
1	"	scutellarioides. D. Lc.	
106	Colvillia.		
1	"	racemosa. C. Oo. St.	
107	Combretum	(Climber.)	
1	"	comosum. A. E. Cn.	
2	"	densiflorum. A. C. E. Cn.	
3	"	grandiflorum. A. E. Cn.	
4	"	macrophyllum. A. E. Cn.	
5	"	Pinceanum. A. E. Rd.	
108	Cookia	(Fruit, Wampee.)	
1	"	punctata. C.	
109	Cordyline.	†	
1	"	Sp. New Zealand.*	C. H.
110	Corynostylis.		
1	"	hybanthus albiflorus.*	B. Pe. We.
111	Corypha	(Palm.)	} C.
1	"	Anstralis.	
2	"	Tabiera.	



Gen.	Sp.	
112	1	<i>Crescentea</i> (Calabash tree.)
		„ <i>Gajeto</i> . D.
113	1	<i>Crinum</i> .
		„ <i>longifolium</i> . G. H.
114		<i>Croton</i> .†
	1	„ <i>aucubæfolium</i> .*
	2	„ <i>elegans</i> .*
	3	„ <i>irregularare</i> .*
	4	„ <i>latifolium</i> .
	5	„ <i>longifolium</i> .
	6	„ <i>pictum</i> .
	7	„ <i>undulatum</i> .*
	8	„ <i>variegatum</i> .
	9	„ <i>Veitchianum</i> .*
	10	„ <i>bicolor</i> .
	11	„ <i>maxima</i> .*
115		<i>Crosandra</i> .
	1	„ <i>infundibuliformis</i> . D. Yw.
	2	„ <i>aurantica</i> . D. De.
116		<i>Cryptostegia</i> (Climber.)
	1	„ <i>grandiflora</i> . B. Pc.
117		<i>Curculigo</i> .†
	1	„ <i>recurvata variegata</i> .* H
	2	„ <i>Sumatrana</i> . H
118		<i>Cycas</i> .
	1	„ <i>circinalis</i> . C.
	2	„ <i>revoluta</i> . C. H.
	3	„ <i>Rumphi</i> . C.
	4	„ <i>sphærica</i> .* C.
119		<i>Cymbidium</i> (Orchid.)
	1	„ <i>alcofolium</i> . H.
120		<i>Cyanophyllum</i> .†
	1	„ <i>magnificum</i> .* A.
	2	„ <i>Bowmanii</i> .* A.
121		<i>Cyrtanthera</i> .
	1	„ <i>aurantica</i> .* D. Yw.
122		<i>Dalechampia</i> .
	1	„ <i>Madagascarensis</i> (Climber.) B. We.
	2	„ <i>Rozliana</i> . B. Pk.
123		<i>Dendrobium</i> (Orchid.)
	1	„ <i>calceolare</i> .
	2	„ <i>fimbriatum</i> .
	3	„ <i>formosum</i> .
	4	„ <i>Gibsoni</i> .
	5	„ <i>moschatum</i> .
	6	„ <i>Pierardi</i> .
	7	„ <i>pulchellum</i> .

Gen.	Sp.		
	8	<i>Dendrobium Veitchianum.</i>	
124		<i>Desmodium</i> (Telegraph plant.)	
	1	" <i>gyans.</i>	C. Yw.
125		<i>Desmoncus.</i> (Palm.)	
	1	" <i>major.</i>	
126		<i>Dianella.</i>	
	1	" <i>nemorosa.</i>	C. H. Wc.
127		<i>Dichica.</i>	
	1	" <i>rasiflora.</i>	C. H.
128		<i>Dieffenbachia.</i> †	
	1	" <i>Bausei.*</i>	B. H.
	2	" <i>Bowmanii.*</i>	
	3	" <i>lineata.</i>	
	4	" <i>Weirii.*</i>	
129		<i>Dillenia.</i> (Fruit, Chulta)	
	1	" <i>speciosa.</i>	C. Wc.
130		<i>Dipterocarpus.</i>	
	1	" <i>alatus.</i>	C.
131		<i>Dombeya.</i>	
	1	" <i>acutangula.</i>	} E Wc.
	2	" <i>palmata.</i>	
	3	" <i>viburnifolia.</i>	
132		<i>Dracæna.</i> †	
	1	" <i>albicans.*</i>	
	2	" <i>Australis</i>	
	3	" <i>cernua.</i>	
	4	" <i>Chelsoyi.*</i>	
	5	" <i>Cooperii.*</i>	D. H.
	6	" <i>ferrea.</i>	
	7	" <i>gracilis.*</i>	
	8	" <i>Guilfoylei.*</i>	
	9	" <i>Haugeana.*</i>	
	10	<i>Dracæna.</i> <i>Jacquinii.</i>	
	11	" <i>nigricans.*</i>	
	12	" <i>pulcherrima.*</i>	D. H.
	13	" <i>reflexa.</i>	
	14	" <i>stricta.</i>	
	15	" <i>terminali.</i>	
133		<i>Dracænosis.</i>	
	1	" <i>angustifolia.</i>	D. H.
	2	" <i>sp.</i>	
134		<i>Duranta.</i>	
	1	" <i>Ellesii.</i>	We.
	2	" <i>Plumieri.</i>	D. Lc.
135		<i>Echinopsis.</i>	
	1	" <i>leucotricha.</i>	
	2	" <i>intermedia.</i>	H.

18 *Plants available in the Garden of the*

Gen	Sp		
	3	<i>Ehinopsis oxygonia.</i>	
	4	<i>Zuccariniana.</i>	
136		<i>Echites (Oltmber)</i>	
	1	" <i>caryophyllata.</i>	We
	2	" <i>paniculata</i>	B. We.
	3	" <i>rubronerva.*</i>	
137		<i>Elæagnus.</i>	
	1	" <i>dulcis.</i>	
	2	" <i>pungens *</i>	A.
	3	" <i>variegata *</i>	
138		<i>Klæodendron.</i>	
	1	" <i>orientalis.</i>	B.
139		<i>Eranthemum</i>	
	1	" <i>bicolor.</i>	} We. We. Be Be Be.
	2	" <i>Blumii.</i>	
	3	" <i>crenulatum.</i>	
	4	" <i>grandifolium.</i>	
	5	" <i>nervosum</i>	
	6	" <i>pulchellum.</i>	
	7	" <i>strictum</i>	
	8	" <i>igneum *</i>	
140		<i>Eriococus</i>	
	1	" <i>glaucescens.</i>	D.
	2	" <i>sp</i>	
141		<i>Erytheroxylon.</i>	
	1	" <i>coca</i>	A.
142		<i>Erythrina</i>	
	1	" <i>Blakei</i>	Cn.
	2	" <i>Christa galli.</i>	A C. Cn.
	3	" <i>Indica</i>	
	4	" <i>laurifolia.</i>	Cn.
143		<i>Eucalyptus.</i>	
	1	" <i>rostratus</i>	C.
	2	" <i>teritaconus.</i>	
	3	" <i>sp.</i>	
144		<i>Eucharis.</i>	
	1	" <i>amazonica.</i>	G. We.
145		<i>Eugenia (Fruit)</i>	
	1	" <i>alba.</i>	
	2	" <i>Jambosa.</i>	C. E.
	3	" <i>Jambolana.</i>	
	4	" <i>Zeylanica.</i>	
146		<i>Euonymus.</i>	
	1	" <i>Japonica.</i>	D.

Gen	Sp.			
147		<i>Euphorbia</i>		
	1	" <i>Bojerr</i>	} B	St Pk.
	2	" <i>capensis</i>		
	3	" <i>Cattamandoo</i>		
	4	" <i>jacquiniiflora</i>		
	5	" <i>splendens</i>		
	6	" <i>tetragonum</i>		
	7	" <i>frigonia</i>		
148		<i>Eurycles</i> ¶		
	1	" <i>Amboynensis</i>	G	Vt
149		<i>Euterpe</i> (Palm)		
	1	" sp		
150		<i>Exostemma</i>		
	1	" <i>chontalensis</i> *	A	
151		<i>Feronia</i> (Fruit, Kuth-bel)		
	1	" <i>elephantum</i>	G	D.
152		<i>Ficus</i>		
	1	" <i>comosa</i>	} D	
	2	" <i>churnea</i> *		
	3	" <i>elastica</i>		
	4	" <i>Indica</i>		
	5	" <i>repens</i>		
	6	" <i>religiosa</i>		
	7	" <i>stipulata</i>		
	8	" sp		
153		<i>Fittonia</i> †		
	1	" <i>argyrenosa</i> *		
	2	" <i>Pericea</i> *		
	3	" <i>rubro-nervia</i> *	D	
154		<i>Flacourtia</i> (Fruit, Puneecala Plum)		
	1	" <i>cataphracta</i>	G	
155		<i>Fourcroya</i>		
	1	" <i>bulbosa</i>	H	
156		<i>Gasteria</i>		
	1	" <i>Bowieana</i>	H	
157		<i>Garcinia</i>		
	1	" <i>Livingstonia</i> *	C	
	2	" <i>Roxburghii</i>		
158		<i>Gardenia</i>		
	1	" <i>florida</i>	} D	We.
	2	" <i>Fortuniana</i>		
	3	" <i>lucida</i>		
159		<i>Galpinia</i>		
	1	" <i>nutans</i>	D	Yw
160		<i>Gelonium</i>		
	1	" <i>angustifolium</i>	A.	Yw.

Gen	Sp		
161		Gesnera	
	1	Ada *	}
	2	amabilis *	
	3	citrina rosea *	
	4	insignis *	
	5	Lindlyana *	
	6	Madame A. Lacomble *	
	7	Morgenticht *	
	8	Nikets *	
	9	Octavia *	
	10	Rosalie *	
	11	rosea punctata *	
	12	Sceptic Count *	
	13	tubifera *	
	14	Zoumenda *	
162		Ginoria	
	1	Americana A	
163		Gloriosa	(( lumber )
	1	superba	C G, Yw St
164		Gloxinia	
	1	Acton Green E *	}
	2	Advancer L *	
	3	C A Lissina *	
	4	Fenlon *	
	5	Grothe L *	
	6	Grand i Paris *	
	7	John Gray L *	
	8	Lamartine E *	
	9	Lauri *	
	10	maculata *	
	11	Madame Gustave Guilmet *	
	12	Montfort *	
	13	Seiller *	
165		Goldfussia	
	1	anisophylla	D Pe
	2	isophylla	D Lc
166		Graptophyllum	
	1	hortense	
	2	"	lurido sanguineum
	3	"	pictum
	4	"	rubra picta
167		Grevillia	
	1	robusta	G
168		Grewia	
	1	asiatica	G E

\* Those marked E have erect flowers

Gen	Sp							
169	1	Guazuma						
	1	"	tomentosa	G				
170	1	Habrothamnus						
	1	"	fasciculatus	B	Cn			
171	1	Hamelia						
	1	"	patens	Oc				
	2	"	sp. hemicarpa	C	D	Oc		
172	1	Hedychium						
	1	"	coronarium	H	We			
173	1	Holceteris						
	1	"	isora	C				
174	1	Heliotropium						
	1	"	peruvianum	D	Lc			
175	1	Hexacentis						
	1	"	coccinea	H				
176	1	Hibiscus						
	1	"	Cooperi	†	D			
	2	"	Collinsii	C	Yw			
	3	"	Jepoldiana	C	Cn			
	4	"	Lampus	C				
	5	"	mutabilis	C	Pl			
	6	"	rosa sinensis					
	7	"	"	alba variegata	*			
	8	"	"	crinco plenus				Fh
	9	"	"	ciucutus	*			Cn
	10	"	"	grandiflor				Cn
	11	"	"	luteo plenus				Yw,
	12	"	"	omnatus simpl	*			Cn
	13	"	"	rubri plenus				Cn
	14	"	Syracus					
	15	"	"	albus				
	16	"	"	plenus				
177	1	Hippocistis						
	1	"	ambiguum	G	We.			
	2	"	vittatum		Rd			
178	1	Hiptage						
	1	"	Madoblota	C	E	We		
179	1	Hoya (Clumba)						
	1	"	carnea	D				
	2	"	Pottii					
	3	"	sp					
180	1	Holmskjoldia						
	1	"	sanguinea	D	Rd			
181	1	Holostemma						
	1	"	Rheedianum	C				
182	1	Hydrangea						
	1	"	mutabilis	B				

22 *Plants available in the Garden of the*

Gen.	Sp.	
183		<i>Hypericum.</i>
	1	" <i>chinensis.</i> H. Yw.
184		<i>Hyophorbe</i> (Palm.)
	1	" <i>Verschaffettii.</i>
185		<i>Hypoestis.</i>
	1	" <i>dixiana.</i> D.
	2	" <i>purpurea.</i>
186		<i>Imantophyllum.</i>
	1	" <i>cyrtanthiflorum.*</i> H. Oe.
	2	" <i>miniatum.*</i> Oe.
187		<i>Indigofera.</i>
	1	" <i>violacea.</i> C. B. Vt.
188		<i>Inga.</i>
	1	" <i>dulcis.</i> } C. D. Yw.
	2	" <i>hamatoxylon.</i> } St.
189		<i>Ipomea.</i>
	1	" <i>Learii.</i> E. Be.
	2	" <i>macrorrhiza.</i> Yw.
	3	" <i>semperflora.</i> D. Be.
190		<i>Iresine.</i>
	1	" <i>Herbesti.</i> }
	2	" <i>aurea reticulata.</i> } D.
	3	" <i>acuminata.*</i> }
	4	" <i>Lindenii.*</i> }
191		<i>Iris.</i>
	1	" <i>iberica.*</i> H.
192		<i>Isotoma.</i>
	1	" <i>longiflora.</i> H. We.
193		<i>Ixora.</i>
	1	" <i>amabilis.*</i> }
	2	" <i>amboinica.*</i> }
	3	" <i>affinis.*</i> }
	4	" <i>bhanduca.</i> }
	5	" <i>barbata.</i> } D.
	6	" <i>coccinea.</i> }
	7	" <i>Dixiana.*</i> }
	8	" <i>sp from Java.</i> }
	9	" <i>sp dwarf.</i> }
	10	<i>Ixora. ragoosula.</i>
	11	" <i>rosea.</i> Fh.
	12	" <i>stricta.</i> Fh.
194		
195		<i>Jacquinia.</i>
	1	" <i>ruscifolia.</i> A. E. Yw.
196		<i>Jasminum.</i>
	1	" <i>angustifolium.</i> We.

Gen.	Sp.			
	2	<i>Jasminum auriculatum</i>	Yw.	
	3	" <i>Azoricum</i>	We	
	4	" <i>fruticans</i>	D. We.	
	5	" <i>grandiflorum</i>	We.	
	6	" <i>pubescens</i>	Pk	
	7	" <i>sambac</i>	We.	
	8	" <i>floro pleno</i>	We.	
	9	" <i>trinerve</i>	We.	
197		<i>Jatropha</i>		
	1	" <i>integerima</i>	G.	} Rd. St.
	2	" <i>multifida</i>		
	3	" <i>panduræfolia</i>	G D	
198		<i>Jemelina</i>		
	1	" <i>parvifolia</i>	D. Yw.	
199		<i>Juniperus</i>		
	1	" <i>chinensis</i>	G.	
200		<i>Justicia</i>		
	1	" <i>carnea</i>		Fh.
	2	" <i>coccinea</i>		St
	3	" <i>gendarusa</i>	D.	We.
	4	" <i>Lobbi</i>		Lc
	5	" <i>secunda</i>		Oe.
201		<i>Koempferia</i>		
	1	" <i>rotunda</i>	H Pe	
202		<i>Lafœnsia</i>		
	1	" <i>vandelliana</i>	D. Pk.	
203		<i>Lagerstromia</i>		
	1	" <i>Indica</i>	Lc	
	2	" "	alba We.	
	3	" "	hincina B G	Lc.
	4	" "	rosea Pk.	
	5	" "	Reginæ Lc.	
204		<i>Lantana</i>		
	1	" <i>selloviana</i>	D Lc.	
205		<i>Laxia</i>		
	1	" <i>heterophylla</i>	B H.	
206		<i>Latania (Palm)</i>		
	1	" <i>glaucophyllum</i>		
	2	" <i>borbonica</i>		
207		<i>Laurus</i>		
	1	" <i>dulcis</i>	G.	
208		<i>Lawsonia</i>		
	1	" <i>alba</i>	D. We.	
209		<i>Leea</i>		
	1	" <i>sanguinea</i>	H.	
210		<i>Lemonia</i>		
	1	" <i>spectabilis</i>	D. Pk.	



Gen	Sp			
211	1	Libonia.		
	1	" Penrhosiensis *	B.	St.
212	1	Licuala (Palm)		
	1	" spinosa		
213	1	Linum		
	1	" trigynum.	D	Yw
	2	" tetragynum.		Yw.
214	1	Littaea.		
	1	" gemniflora	H.	
215	1	Lavistona (Palm.)		
	1	" Australis.		
	2	" Hoogendorpi.		
	3	" Mauritiana		
	4	" Sinensis.		
216	1	Lonicera (Climber)		
	1	" brachypoda.	D	We.
217	1	Macadamia		
	1	" ternifolia	D.	
218	1	Makaya.		
	1	" bella *	D.	St
219	1	Mackfordania (Climber)		
	1	" uncillata.	D.	
220	1	Mæesa		
	1	" nemoralis.	C.	
221	1	Magnolia.		
	1	" pumila.	A. E.	We.
222	1	Malpighia		
	1	" coccifera	B.	We.
	2	" glabra.		We.
	3	" urens.		We.
223	1	Malvaviscus.		
	1	" arboreus.	D.	Rd.
224	1	Maminillaria.		
	1	" centriarrha		
	2	" elongata	H.	
	3	" magnamasna		
	4	" procera.		
225	1	Manettia.		
	1	" cordifolia	H.	St
226	1	Maranta.		
	1	" atrosanguinea *		
	2	" lindeni.		
	3	" virginalis *		
	4	" Zebrina (Calathea.)*		
227	1	Maurandia.		
	1	" Barclayana.	G. D.	Pk.

Gen.	Sp.			
228	1	Melaleuca.		
	1	"	Cajuputi.	A. E. Gn.
229	1	Memecylon.		
	1	"	tinctorium.	A. E. Pc.
230	1	Mimusops.		
	1	"	Elengi.	G.
231	1	Mentha.		
	1	"	auriculata.	H.
232	1	Mesua		
	1	"	ferrea.	G. Wc.
233	1	Meyenia.		
	1	"	erecta.	} D. Vt. Wc.
	2	"	" alba.	
	3	"	vogeliana.	
234	1	Michelia		
	1	"	champaca.	G.
235	1	Monstera	† (Fruit.)	
	1	"	deliciosa.*	H.
236	1	Morus (Fruit)	Mulberry	} D E.
	1	"	Indica.	
	2	"	" var	
	3	"	" var.	
237	1	Murraya		
	1	"	exotica.	G. Wc.
238	1	Murueja		
	1	"	ocellata	G. D.
239	1	Musa (Fruit)	Plantain	} H.
	1	"	Africana *	
	2	"	Cavendishii.	
240	1	Mussaenda.		
	1	"	corymbosa.	} D. Yw Ot Yw Yw.
	2	"	frondosa.	
	3	"	luteola *	
	4	"	macrophylla.	
241	1	Myrtus (Myrtle)		
	1	"	communis.	B. We.
242	1	Nardina.		
	1	"	domestica.	I. We.
243	1	Nauclea.		
	1	"	cadamba	C. Yw.
244	1	Nephelium (Fruit)		
	1	"	Lichi (Lichie.)	} E. F
	2	"	" McLean's	
	3	"	" Sharpe's	
	4	"	" round	
	5	"	longan (Ashphul.)	G.

Gen.	Sp.			
245	1	Nephrodium (Fern)		
246	1	"	molle.	
247	1	Napoleona.	Imperialis.	A.
	1	Nerium.		
	2	"	oderum.	
	3	"	albo simplex	D. We.
	4	"	roseolo simplex.	Pk.
		"	roseo pleno.	Pk.
248	1	Nyctanthes.		
	1	"	Arbor-tristis	G. We.
249	1	Ochna.		
	1	"	squarrosa.	G E. Yw.
250	1	Olea.		
	1	"	fragrans.	B. We.
251	1	Ophiopogon		
	2	"	japonicum.	H. We.
		"	Wighteanum.	We.
252	1	Ophioxylon.		
	1	"	serpentinum.	G H.
253	1	Opuntia.		
	2	"	Brasiliensis	
	3	"	Chiliensis	
	4	"	chochimillefera	
	5	"	curassavica.	
	6	"	crinifera	
	7	"	elator	
	8	"	spinosissima.	
	9	"	stapalæ.	
	10	"	sp.	
	11	"	Tuna.	
	12	"	" leucantha	
	13	"	vulgaris	
254	1	Oreodoxa (Palm)		
	1	"	acuminata.	
255	1	Orthosiphon.		
	1	"	incurvus.	G D.
256	1	Osmanthus.		
	1	"	ilicifolius.*	A.
257	1	Panax.		
	2	"	aculeata.	
	3	"	cochleata.	
	4	"	fruticosa.	
		"	longissima.	

D.

We.

Gen.	Sp.			
258	1	Pancratium.		
	2	"	fragrans. G. We.	
		"	littorata. We.	
259		Pandanus.		
	1	"	inermis.	} H.
	2	"	Javanica.	
	3	"	" variegata.	
	4	"	Lerum.	
	5	"	sp.	
260		Papyrus.		
	1	"	antiquorum. H.	
261		Pardanthus.		
	1	"	chinensis. H.	
262		Paritium.		
	1	"	tortuosum. G.	
263		Parkinsonia.		
	1	"	aculeata. G. Yw.	
264		Parsonsia.		
	1	"	corymbosa. El.	
265		Passiflora (Climber.)		
	1	"	alata.	} B.
	2	"	cærulea.	
	3	"	" racemosa.	
	4	"	Holoracæricea.	
	5	"	kermisina. Rd.	
	6	"	Harwiniana*	
	7	"	laurifolia.	
	8	"	lunata.	
	9	"	Mideltoniana.	
	10	"	marocarpus.*	
	11	"	mutabilis.*	
	12	"	madonia.*	
	13	"	mayana.	
	14	"	quadrangularis.	
	15	"	serratifolia.	
	16	"	tryfassiata.*	
	17	"	Imperatrix Eugenie*	
266		Peach, (Fruit).		
	1	"	Agra, from Lucknow.	
	2	"	Early York.*	
	3	"	" Louise.* F.	
	4	"	Hurdai, from Lucknow.	
	5	"	Nagpore	
	6	"	River's Early York.*	
	7	"	Aloobokhara, from Lucknow. F.	

Gen.	Sp.		
267.	1	Pedilanthus.	
	1	" pithimaloides.	G. D. Rd.
268	1	Pentas.	
	1	" carnea.	D. Fh.
269	1	Pereskia.	
	2	" aculeata.	
	2	" " Bleo	D. Fh.
270	1	Pergularia (climber)	
	1	" odoratissima.	H
271	1	Persca (Fruit, Avocado Pear)	
	1	" gratissima.	G.
272	1	Petalidium	
	1	" bignonaceum	D.
273	1	Petrea	
	1	" volubilis.	D.
274	1	Philodendron.	
	2	" pertusum.	G E.
	2	" scandens.	
275	1	Phlogacanthus.	
	1	" thyrsiflorus.	D. Br.
276	1	Phoenix.	
	2	" paludosa.	
	2	" rubricaulis.	
277	1	Pholidota orchid.	
	1	" imbricata.	
278	1	Phormium.	
	1	" tenax* (New Zealand flax)	G H:
279	1	Piper.	
	2	" magnolifolia.	} B.
	2	" marmorata.	
	3	" nigrum	
	4	" vorschaffetea.*	
280	1	Pitcarnea.	
	1	" bromeleæfolia.	H. St.
281	1	Pitunga.	
	1	" Roxburghii.	G.
282	1	Pittosporum.	
	2	" Tobira.	
	2	" variegatum.	E.
	3	" verticillatum.	
283	1	Plectranthus.	
	1	" aromaticus.	D.
284	1	Plectocomia (Palm,)	
	1	" Assamica.	

Gen	Sp				
285		Plumbago.			
	1	"	carpensis.	G. D.	Be
	2	"	rosea		Pk
	3	"	Zeylanica		We.
286		Plumiera.			
	1	"	acuminata	D.	We.
287		Podocarpus			
	1	"	spinulosus *		
	2	"	chinensis.	A.	
288		Polianthus			
	1	"	tuberosus.	G	We
289		Poinciana.			
	1	"	Gillii.	C.	Yw.
	2	"	pulcherrima.		
	3	"	"		bicolor
	4	"	"		concolor.
	5	"	regia.		St.
290		Poinsettia			
	1	"	pulcherrima	D	St
	2	"	"	alba	We.
291		Poivrea (Climber).			
	1	"	coccinea	C. E.	Cn.
292		Porana (Climber).			
	1	"	paniculata.	H.	
293		Pothos			
	1	"	gigantens.	H.	
	2	"	scandens.		
294		Psychotria.			
	1	"	cyanacocca *	B.	We.
	2	"	chontalensis *		
	3	"	undata		
295		Psidium (Fruit) Guava			
	1	"	cujabilis	E.	
	2	"	oxyphyllum		
	3	"	gracilis		
296		Pterocarpus			
	1	"	indicus	C.	
297		Pteris (Fern)			
	1	"	longifolia.		
	2	"	serrulata.		
298		Pterospermum			
	1	"	acerifolium	C.	
	2	"	lanceifolium.		
299		Punica (Fruit) Pomegranate			
	1	"	granatum	A. E.	St.
	2	"	"	flore pleno.	St.

Gen.	Sp.			
300		Quisqualis (climber.)		
	1	" glabra.	E. H.	We. Rd.
	2	" Indicus.		
301		Raphiolepus.		
	1	" Japonica integerrima.*	G. A.	We.
	2	" ovata.*		
302		Raphis (Palm.)		
	1	" flabilliformis.		
303		Rhyncospermum (climber.)		
	1	" jasminoides.	D.	We.
304		Richardia.		
	1	" aethiopica.	G	We.
305		Rogiera.		
	1	" thyrsiflora.*	A E.	We.
306		Rondeletia.		
	1	" speciosa.	A. E.	Oe.
307		Roupellia.		
	1	" grata.	D.	We.
308		Russelia.		
	1	" floribunda.	D. H.	Rd.
	2	" juncea.	Rd.	
309		Ruta (Rue)		
	1	" angustifolia.	B.	
310		Sabal (Palm.)		
	1	" Adansoni.		
	2	" minor.		
311		Saccharum.		
	1	" officinarum (Sugar-cane.)		
	2	" Barklay-cane.		
	3	" Barata mie.		
	4	" Boti.		
	5	" Bouron.		
	6	" Djomba Kourg.		
	7	" Kavangery.		
	8	" Munenion.		
	9	" Naga.		
	10	" Perana.		D. H.
	11	" Onapa.		
	12	" Onata.		
	13	" Rhi.		
	14	" Tiboo.		
	15	" Tikonia.		
	16	" Tischoogo.		
	17	" Tischiapa.		
	18	" Tsagnia.		
	19	" Tseaka.		
	20	" Tsimbia.		
	21	" Whanendon.		

Gen.	Sp.	
312	1	Salvia
	2	" coccinea. C D. St.
	2	" splendens. D. St.
313		Salix (Weeping Willow)
	1	" Babylonica. D.
314		Sanchezia †
	1	" nobilis glaucophylla D. Yw.
	2	" variegata.
315		Sansevieria †
	1	" Zeylanica } H. Ws.
	2	" sp
	3	" sp
316		Sapindus
	1	" unmarginatus E.
317		Sarcanthus
	1	" sp Orchid
318		Seaforthia (Palm)
	1	" elegans
	2	" sp Andamans.
319		Selaginella
	1	" intermedia D H
	2	" longigata
320		Sericographis
	1	" Ghiesbrihtiana * D St.
	2	" squarrosa Oe.
321		Serissa
	1	" foetida D Wc
322		Solanum
	1	" argenteum H Pe
	2	" ciliatum * (Fine scarlet berry) G.
	3	" coreaceum D Lc.
	4	" macrophyllum C Vt.
323		Sophora
	1	" tomentosa. C Yw
224		Spathodea
	1	" campanulata E.
325		Spiræa
	1	" corymbosa. L Wc,
326		Spondias.
	1	" dulcis F.
327		Stachytarpheta.
	1	" Jamaicensis Vt
	2	" mutabilis D. Rd.
	3	" orubica. Lc
328		Stemonocanthus.
	1	" formosus. D. Lc.



Gen.	Sp.			
329		Strobilanthis.		
	1	" sabiniana.	} D.	Yw.
	2	" scabra.		Yw.
	3	" tomentosa.		We.
330		Swietenia (Mahogany)		
	1	" Mahagoni	C. E.	
331		Tabernæmontana		
	1	" coronaria.	D.	We.
	2	" Wallichiana.		
332		Talauma.		
	1	" pumila.	E.	
333		Taxus		
	1	" chinensis.	A.	
334		Tecoma		
	1	" capensis.	} D.	Oe.
	2	" grandiflora (climber)		Br.
	3	" jasminoides (climber)		Oc St.
	4	" radicans (climber)		
	5	" stans	C. Yw	
	6	" var.	Yw.	
335		Tectona.		
	1	" grandis	C.	
336		Tetranema.		
	1	" Mexicana.	H. Lc.	
337		Terminalia.		
	1	" catappa (Country Almond)	C.	
	2	" elegans.*	A.	
338		Theobroma.		
	1	" cacao (Chocolate nut Tree)	C.	
339		Thespesia.		
	1	" populnea.	C. E. Yw	
	2	" "	variegata	
340		Thevetia.		
	1	" nerifolia.	G. Yw.	
341		Thrinax (Palm)		
	1	" glauca.		
342		Thunbergia (climber)		
	1	" coccinea	} D.	We.
	2	" fragrans		Lc.
	3	" grandiflora		We.
	4	" " alba		Vt.
	5	" Hawteyniana		
	7	" nerifolia.	A. C. Lc	
343		Thuja.		
		" orientalis.		

Gen.	Sp.	
344	1	<i>Thyrsacanthus</i> . D.
345	1	<i>rutilans</i> . St.
	1	<i>Trophis</i> .
	1	<i>aspera</i> . B.
346	1	<i>Turnera</i> .
	1	<i>triniflora</i> . D. Yw.
347	1	<i>Uralia</i> ( <i>Ravenalia</i> ).
	1	<i>Madagascarensis</i> (Traveller's Tree.) C. H
348	1	<i>Uraria</i> .
	1	<i>macrostachya</i> . C.
349	1	<i>Urtica</i> .
	1	<i>nivea</i> (Rhea.) D.
350	1	<i>Vanda</i> (Orchid.)
	1	<i>Roxburghii</i> .
	2	<i>Teres</i> .
351	1	<i>Vanilla</i> (Orchid.)
	1	<i>aromatica</i> .
	2	<i>planifolia</i> .
352	1	<i>Vinca</i> .
	1	<i>alba</i> . C. B. Wo.
	2	<i>rosea</i> . Pk.
353	1	<i>Vitex</i> .
	1	<i>incisa</i> . C.
354	1	<i>Vitis</i> .
	1	<i>heterophylla variegata</i> .*
	2	<i>vinifera</i> (Grape)
	3	" <i>Alicant</i> .*
	4	" <i>Aramon</i> .*
	5	" <i>Black monucka</i> .*
	6	" <i>morocco</i> .*
	7	" <i>Prince</i> .*
	8	" <i>Vinifera</i> .
	9	" <i>Chassus musque</i> .*
	10	" <i>Grös Guillaume</i> .*
	11	" <i>Colman</i> .*
	12	" <i>Peter White's seedling</i> .*
	13	" <i>Muscat Hambro</i> .*
	14	" <i>Of Alexandria</i> .
	15	" <i>Noir de Eisenstadt</i> .
	16	" <i>Madersfeld coult Muscat</i> .*
	17	" <i>Royal muscadine</i> .*
	18	" <i>Ascot</i> .
	19	" <i>Rasin de Calabra</i> .*
	20	" <i>White Nice</i> .*
355	1	<i>Westeria</i> (climber).
	1	<i>Chinensis</i> . E. Lc.

D. E.

Gen.	Sp.		
356	1	Wrightia.	
		antidysenterica.	C.
357		Xanthocymus pictorius (Fruit)	Toomul. C
358		Yucca †	
	1	" aloifolia.	} H. We.
	2	" " variegata	
	3	" gloriosa	
359		Zizyphus (Fruit)	
	1	" Jujubi (Bacr)	} E.
	2	" vulgaris (Toot Phul.)	

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OF THE

Agricultural and Horticultural Society

OF

INDIA.

---

DECEMBER 31<sup>st</sup>, 1873.

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ALPHABETICALLY ARRANGED

AND

DISTINGUISHING THE YEAR OF ADMISSION.



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### B

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II—(Continued.)

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Commandant of the Erinpoorah Irregular Force, Erin- poorah	1871
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Gamble, J. Sykes, Esq., Asst. Conservator of Forests, Darjeeling ...	1872
Garbett, Lieut C. H. Asst. Commr., Maunbhoom ...	1868
Gardaer, D. M. Esq., Civil Service, Jaunpore ...	1872
Gibbon, T. M. Esq. Indigo Planter, Bettiah Factory, Tirhoot ...	1860
Gibbon, W. F. Esq., Seur., Doolha Factory, Goruckpore	1870
Gilbert, Edwin, Esq., Ex.-Engineer, C. I. Administration, Morar ...	1871
Gillam, F. A. Esq., Agent, Bank of Bengal, Calcutta ...	1870
Girdlestone, C. E. R. Esq., Civil Service, Katmandoo	1872
Glass, † J. Esq., Ex.-Engineer, D. P. W. ...	1866
Goluck Chunder Bose, Baboo zemindar, Cuttack ...	1871
Goonendra Nath Tagore, zemindar, Calcutta ...	1872
Gopeenath Roy, Baboo, Calcutta ...	1871
Gordon, † John Esq., Bank of Bengal ...	1865
Gouldhawke, J. Esq., Lallpore Concern, Purneah ...	1851
Gowan, Lieut.-Col. J. Y., Bengal Staff Corps, 2nd in Command, 33rd Regt. N. I., Allahabad ...	1865
Grace, Geo. Esq., Tazepore, Assam ...	1865
Graf, C. Esq., Merchant, Calcutta ...	1869



G.—(Continued).

	Admitted.
Graham, † Joseph Esq., Barrister-at-Law	1858
Graham, W. F. Esq., Indigo Planter, Colgong	1862
Graham, W. Forbes, Esq., Ourungabad via Pakour	1867
Graham, Wm. Francis Esq, M. C. S., Chicacole	1871
Grant, Thomas Esq., Indigo Planter, Bhagulpore	1848
Grant, G. H. Esq., Indigo Planter, Bhagulpore	1859
Grant, † C. Esq., ..	1864
Gray, Henry A. Esq., Solicitor, Calcutta	1869
Greetham, R. T. Esq., Clerk of Works, S. P. and D. Rail- way, Saharunpore	1878
Grey, Lieut. L. J. H., Asst. Commr., Ranchie	1871
Greenwood, W. J. Esq., Asst Commr., Lullutpore	1871
Grees Chunder Sing, Coomar, Zemindar, Pikeparah, near Calcutta	1867
Grey, † Ch. Esq., Civil Service	1868
Griffith, Ralph Esq., Principal, Queen's College, Benares	1870
Grote, A. G. Esq., Baraitch, Onde	1866
Growse, F. S. Esq. Muttra	1870
Guiso, † J. J. Esq., Merchant	1867
Gungapershad, Baboo, Deputy Collector, Moradabad	1871

H.

HALFORD, † Chs. Esq., Bill Broker	1872
Halkett, D. C. Esq., Civil Service, Humeerpore, North- West Provinces	1870
Halsey, F. Esq., Manager, Branch Bank of Bengal, Um- ritsur	1863
Hall, R. W. Esq., Balladhun Garden, Cachar	1870
Hamilton, J. O. Esq., Indigo Planter, Nurhar Factory, Mudobarry, Tuhoot	1867
Hamilton, T. F. Esq., Merchant, Calcutta	1870
Harkin, Lieut-Col, G. C., Segowlie	1864
Harlow, Wm. Esq., Manager, Eastern Cachar Tea Com- pany, Cachar	1871
Harrison, Augustus S. Esq., Principal of the Minor College Allahabad	1873
Harris, G. L. Esq., C. S., Gya	1863
Harrison, H. A. Esq., Civil Service, Futtoghur	1863
Harrison, Revd. H. J., Tollygunge	1872
Harrold, † H. M. Esq., Tea Planter,	1863
Hart, Robert Esq., Planter, Heroncherra Garden, Cachar	1872
Hawkins, † John Abraham Francis, Esq.	1837

add.

H.—(Continued.)

	Admitted.
Hawkins, Capt. E. L., R.A., Morar . . .	1871
Haworth, † J. H. Esq., Broker . . .	1870
Hay, P. J. Esq., Manager, Sildobie Tea Garden, Cachar	1870
Hayes, Dr. W. H. . . .	1861
Hazlett, Dr. H. L., Berhampore, Ganjam . . .	1878
Health Officer, Calcutta . . .	1865
Heely, W. L. Esq., C. S., Insp. Genl. of Jails, Calcutta	1864
Henderson, Dr., G. Civil Surgeon, Lahore . . .	1868
Henderson † M. Esq., Merchant . . .	1864
Heralall Seal * Baboo, Calcutta . . .	1858
Herklots, D. G. Esq., Agriculturist, Calcutta . . .	1870
Herschell, † Sir W. J., Bart., Civil Service. . .	1870
Hill, Dr. J. H. G., Turcooleah Factory, Moteeharte Chum- parun . . .	1865
Hill, R. H. Esq., Seraba, Tirhoot . . .	1865
Hills, *† James, Esq., Senior, Indigo Planter . . .	1837
Hindhaugh, T. S. Esq., Chowkeedangah, Raneegunge . . .	1870
Hindmarsh, Thomas Esq., Eastern Bengal Railway Kan- charapara . . .	1866
Hittoll Messer, Baboo, Zemindar, Mauncoor . . .	1864
Hobart, R. T. Esq., Itah . . .	1870
Hobhouse, Hon'ble Arthur., Legal Member of the Su- preme Council, Calcutta . . .	1872
Hogg, Capt. T. W. Assistant Commissioner, Harda . . .	1868
Hollway, F. H. Esq., Indigo Planter, Monghyr . . .	1863
Hollway, Capt. E. V., 5th Irregular N. I. . . .	1870
Holroyd, Col. Charles, Barrackpore . . .	1866
Home, Major, R. Supdg. Engineer, Umballa Cantonment, Umballa . . .	1873
Homfray, J. N. Esq., Bengal Marine Service, Port Blair	1863
Hoskins, Dr. E. J., Civil Surgeon, Raichee . . .	1870
Hosson, † A. Esq., Merchant . . .	1872
Howard, Dr. J. S., Civil Surgeon, Oomraotee . . .	1870
Hudson, † Cunningham, Esq., Merchant . . .	1867
Hudson, C. E. Esq., Bugli Pingra, Azimgurh . . .	1870
Hynde, Hy. Turibull, Esq., Manager, Raneegunge Coal Association, Raneegunge . . .	1873
Hwrendhur Kishore Singh, Baboo, Betteah, Tirhoot . . .	1870
Hurst, J. Esq., Mussoorie . . .	1870
Hutchinson, Col. A. R. E., Political Agent, Morar, . Gwalior . . .	1862
Hutchinson, J. H. Esq., Merchant, Calcutta . . .	1870
Hyslop, Archibald, Esq., Merchant, Bimlipatam . . .	1867

*Admitted.*

INGELS, Lionel, Esq., Manager, Namdang Estate, Seeb-sagur, Upper Assam	...	...	1872
Inghis, A. B. Esq., Merchant, Calcutta	...	...	1873
Inskip, C. T. Esq., Calcutta	...	...	1875
Imthurn, Dr. A. M. D., Civil Medical Officer, Tezpur, Assam	...	...	1873
Ireland, Wm. De Courey, Esq., Dy. Commr, Akyab	...	...	1871
Irshad Ali Khan Kunwar, landowner, Sadabad, Muttra	...	...	1872
Irving, Dr. James, Civil Surgeon, Allahabad	...	...	1867
Irwin, Lient-Col. W., Stud. Dept, Saharanpore	...	...	1864
Isack, † Thos. S. Esq., Supdg Engineer	...	...	1869
Ishore Pershaud Narain Singh, Bahadoor, Rajah of Benares	...	...	1854

J.

JACK, E. A. Esq., Merchant, Calcutta	...	...	1863
Jackson, Hon'ble L. S., Civil Service, Calcutta	...	...	1852
Jackson, C. E. Esq., Manager, New Mutual Tea Co. Lall-mookh, Hylakandy, Cachar	...	...	1873
James, A. H. Esq., Assistant Commissioner, Naga Hills, Assam	...	...	1868
Jameson, W. Esq., M. D., Saharanpore	...	...	1852
Jarrett, Capt. H. S., Calcutta	...	...	1871
Jennings, C. B. Esq., Sylhet	...	...	1862
Jennings, † Samuel, Esq.	...	...	1863
Jerdon, C. M. Esq., Sub-Deputy Opium Agent, Gya	...	...	1872
Johnson, H. Lattman, Esq., Civil Service, Calcutta	...	...	1873
Johnstone, † Capt. J., Special Asst. to Suptl. of Tributary Mohals	...	...	1871
Jones, Frederick, Esq., Civil Service, Serampore	...	...	1870
Jones, H. Lloyd, Esq., Bengal Police, Dinapore	...	...	1871
Jones, W. H. Esq., Calcutta	...	...	1863
Joy Singh, * Deo Bahadoor, Maharajah of Chikari	...	...	1868
Joykissen Mookerjee, Baboo, Zemindar, Ooterparah	...	...	1852
Judge, W. J. Esq., Solicitor, Calcutta	...	...	1858
Jung, * Bahadoor, Maharajah, G. C. B., Nepal	...	...	1860

K.

KALEE Kissen Tagore, Baboo, Calcutta	...	...	1869
Kally Prosono Roy, Baboo, Zemindar, Nornal, via Jessore	...	...	1867
Kemp, Geo. Luca, Esq., F. R. G. S., Secretary of the Standard Life Assurance Society, Calcutta	...	...	1871

## K—(Continued)

	Admitted
Kemble, W Esq, Civil Service Purneah ..	1872
Khetternolun Sing, Bahoo, Dinagapore	1870
Kidd, Dr H A, Civil Surgeon, Mundla	1871
Kincaid, Major-Col W, Buel Agent, Sindaspore via Indore.	1867
King,† Dr Geo Supdt, Royal Botanical Garden	1872
Knowles† H Esq, Merchant	1852
Knyvett, Capt W L N, District Supdt of Police, Behampore	1864
Krauss, Henry Esq Rangoon	1865
Kristinder Roy, Rajah, Bolchar, Rajshahyo	1866

## L

LAMB, E Esq Buchour Factory Durbangah, Turhoot	1870
Lamont, J Esq Merchant Calcutta	1863
Lance, C J Esq Civil Service Moulmein	1858
Landale, Geo A Esq Planter Turtipore, Maldah	1868
Lardue Alex Esq Merchant Calcutta	1869
Lauders, J P Esq Telegraph Calcutta	1866
Laudon, P L Esq Esq Minister at Law Vizagipatam	1873
Laurie, W R Esq Civil Service Bangalore	1862
Lawford H B Esq C S Jessore	1865
Lawrie T H Esq, Sudder Factory, Cachir	1872
Leeds, Henry Esq Conservator of Forests Hindia.	1868
Lees Major W M Under Secretary Government of India Military Department	1871
Leibert M Esq Esq Planter Hazaribagh	1868
Leitch, Henry Joseph Esq Broker Calcutta	1872
Leeper, Chris H Debrughur Assam	1873
Leslie, S J Esq Solicitor Calcutta	1873
Lethbridge, T C Esq Moorah Factory Chumpan	1871
Levinge, H C Esq C L And	1863
Lewis, Honble W J, Resident Councillor, Penang	1840
Lindesay, H G Esq, Khoob Factory, Debrughur, Assam	1873
Livesay, C E Esq, Asst-Engineer, Irrigation Dept, Baroon via Dehree	1868
Llewellyn, W Esq Durbangah	1871
Lloyd, M Esq, Indigo Planter, Shapore Oondoe, Turhoot	1863
Lloyd, W Esq, Darjeeling	1869
Locke, H H Esq, Principal, Government School of Arts, Calcutta	1866

[—(Continued).]

Admitted.

Lockhart, Capt. W. S. A., Dy. Assistant Quarter Master General, Peshawur	...	...	1871
Lovell, Thos., Esq., Deputy Chief Engineer, Lucknow	...	...	1869
Lovell, Capt. H. P., Supdt., P. and O. Company, Calcutta	...	...	1870
Lowther, *† Robert, Esq., Civil Service	...	...	1836
Luchmeeput Sing, Roy Bahadoor, Banker, Calcutta	...	...	1864
Luchmessur Sing, Bahadoor, Zemindar, Mozufforpore, Tirhoot	...	...	1861
Lukin, † Major F., 3rd Hussars	...	...	1860
Lushington, H. Esq., C. S., Allyghur	...	...	1865
Lyall, D. R. Esq., Civil Service, Dacca	...	...	1869
Lynam, † John Esq., Supdt., Reserve Police Force, Calcutta	...	...	1866
Lynch, Dr. Sydney, Supdt. of Jail, Alipore	...	...	1872
Lyne, J. P. Hicks, Esq., Merchant, Calcutta	...	...	1873

M.

MACALLISTER, R. Esq., Merchant, Calcutta	...	...	1872
MacDonald, C. Esq., Dowlutpore Factory, via Roosa, Tirhoot	...	...	1867
MacDonald, M. N. Esq., Pertipore Factory, Sarun	...	...	1869
MacDougall, Major W. C., Deputy Inspector of Stnds, Saharunpore	...	...	1867
Macdonald, Aencas, J. Esq., Lohurreah Factory, Chumparun	...	...	1872
Mackenzie, W. S. Esq., Belsund, Tirhoot	...	...	1873
Mackillican, J. Esq., Merchant, Calcutta	...	...	1865
MacLachlan, J. F. Esq., Calcutta	...	...	1861
Maclean, A. T. Esq., Civil Service, Burdwan	...	...	1858
Macmillan, J. Esq., C. E., Cuttack	...	...	1865
Macnaghten, Chester Esq., Principal, Rajkumar College, Rajkote, Kattywur	...	...	1869
Macnochie, G. B. Esq., Offg. Depy. Commr., Gonda Oudh	...	...	1873
Macpherson, Hon'ble A. G., Judge of the High Court, Calcutta	...	...	1867
MacTier, Capt. Stewart C., Bengal Staff Corps, Allahabad	...	...	1873
Mfine, Dr. E. M. Supdt. of Jail, Futtehghur	...	...	1873
Macpherson, † W. Esq., Civil Service	...	...	1861
Macpherson, *† George G. Esq....	...	...	1836

**M. — (Continued.)**

	<i>Admitted.</i>
Macdonald, † Major John, Survey Department ..	1871
Macdonell, Brigadier Genl. A., C. B., Rawul Pinea ..	1871
Mackenzie, Dr. S. C., Superintendent, Presidency Jail, Calcutta ..	1871
McIntosh, R. Esq., Merchant, Calcutta ..	1872
Mackeson, Lient.-Col. F. L., 2nd in Command, Meywar Bheel Corps, Kherwarrah, Rajpootana ..	1860
McCulloch, Col. W., Cherra Poonjee ..	1872
Maharaj * Dheraj Matabchunder Bahadoor, Rajah of Burdwan ..	1836
Maharajah * of Johore ..	1868
Maharajah of Betteah, Tirhoot ..	1870
Maharajah of Cooch Behar ..	1864
Maharajah of Cashmere ..	1872
Mahomed Alli Khan, Moonshee, Government Pleader, Dinagepore ..	1866
Mahony, H. C. Esq., Dhurumkhole Factory, Silchar, Cachar ..	1869
Maitland, Capt. W. G., Asst. Commissioner, Seclaugor, Assam ..	1871
Manager, Government Garden, Fyzabad, Oudh ..	1871
Manager, Tarrapore Tea Garden, Cachar ..	1871
Manager, Chundypore Tea Company, Cachar ..	1862
Manager, Doomra and Rajapattee Indigo Concern, Tirhoot ..	1873
Manager, Kanchunpore Tea Company, Cachar ..	1862
Manager, Victoria Tea Company, Cachar ..	1862
Manager, Bengal Tea Company, Cachar ..	1864
Manager, East India Tea Company, Assam ..	1865
Manager, Dahingcapore Factory, Assam ..	1865
Manager of the Halmarah Tea Estate, Assam ..	1872
Manager, Koeyah Factory, Cachar ..	1865
Manager, Goomrah Factory, Tirhoot ..	1865
Manager, Narainpore Garden, Cachar ..	1865
Manager, Joypore Garden, Cachar ..	1865
Manager, Cutlee Cherra Garder, Cachar ..	1865
Manager, Noakacharee Tea Company, Assam ..	1865
Manager, Public Garden, Bareilly ..	1868
Manager, East India Tea Company, Cachar ..	1866
Manager, Keomtar Tea Garden, Assam ..	1869
Manager, Shillong Tea Estate, Shillong ..	1867
Mandelli, L. Esq., Tea Planter, Darjeeling ..	1868
Manikjee, * Rustomjee, Esq., Merchant, Calcutta ..	1837
Manook, Dr. S. J., Civil Surgeon, Chyebassa ..	1866

M.—(Continued.)

	Admitted.
Marindin, Capt. P. S., B. E., Allahabad	1871
Markby, Hon'ble W., Judge of High Court, Calcutta	1866
Martins, W. R. Esq., Tea Planter, Punkabaree, Darjeeling	1868
Maseyk, J. W. Esq., Indigo Planter, Jungypore	1858
Master, C. G. Esq., M. C. S., Chatterpore, via Ganjam	1871
McAlpine, Robert, Esq., Futtickcherry Estate, Chuttagong	1865
McDonell, W. F. Esq., Civil Service, Bankipore	1866
McFarlane, A. C. Esq., Merchant, Calcutta	1870
Mercer,† Lieut.-Col. T. W.	1866
Meres, W. F. Esq., Civil Service, Hooghly	1870
Meer Mahomed Ali, Zemindar, Farreedpore	1872
Meugens, J. G. Esq., Merchant, Calcutta	1865
Meakin, H. G. Esq., Brewer, Kussowlie	1872
Millar,† Major F. J., Deputy Commissioner	1869
Millie, W. J. Esq., Tea Planter, Chuttagong	1866
Mills, *† Andrew John Moffat, Esq.	1836
Mills,† Lieut.-Col. H., Dy. Asst. Commissary General	1871
Minchin, F. J. V. Esq., Asst., Ganjam	1862
Minto,† W. Esq.	1862
Mitchell, R. Esq., Merchant, Calcutta	1868
Moir, Dr. W., Civil Surgeon, Meerut	1872
Mohesh Chunder Banerjee, Baboo, Cuttack	1869
Mohima Rungun Roy Chowdry, Zemindar, Kakania, Rungpore	1865
Mohendrolall Khan, Koomar, Narajole, Midnapore	1871
Molony, E. W. Esq., C. S., Commissioner	1866
Money, *† W. James Henry Esq., Civil Service	1837
Money, Major R. C., Deputy Commissioner	1860
Monohur Dass, Lalla, Banker, Allahabad	1872
Moore, C. W. Esq., C. S., Azinghur	1865
Moran, F. C. Esq., Manager, Rungorah Factory, Deb- roghur	1870
Moran, J. Kenneth, Esq., Merchant, Chanderanagore	1872
Morris, G. G. Esq., Civil Service, Burrisaul	1872
Mosely, T. H. Esq., Merchant, Calcutta	1862
Mowbray,† Arthur H. Esq., Merchant	1866
Muir, Hon'ble Sir W. K., C. S. I., Lieutenant-Governor of N. W. P., Allahabad	1869
Mullen,† L. Dr. T. Ffrench, Residency Asst. Surgeon, Ul- war, Rajpootana	1871
Murdoch, A. W., Esq., C. E., Serajgunge	1870
Murray,† Col. J. J. Commandant, 14th Bengal Cavalry	1867
Murray, Capt. J., Asst. Conservator of Forests, Mussoorie	1870

N.

Admitted.

Nash, Capt. H. P. 2nd Gorkha Regt., Dehra Dhoon	...	1873
Nawab of Maler Kutla, Loodhiana	...	1873
Nembhard, † Lieut.-Col. W., Commissioner, East Berar	...	1861
Nickels, C. Esq., Indigo Planter, Pusewa Factory, Joun- pore	...	1866
Nobin Chunder Nag, Baboo, Zemindar, Midnapore	...	1866
Noble, † Capt. C. S., Assistant Settlement Officer	...	1870
Nolan Phillip, Esq., Civil Service, Serajgunge	...	1873
Notobur Sing Rajah, Thundraj Bromobur Roy Killoh- Khand Padda	...	1873
Noor Khan, Huzrut, Minister of Jowrah	...	1871
Nuthall, † Major General W. F.	...	1871

O.

OBHOYCHURN Goho, Baboo, Merchant, Calcutta	...	1856
Odling C. W., Esq., C. E., D. P. W., Bhuddruck	...	1871
Ogbourne, C. H. Esq., Calcutta	...	1867
Ogilvy, † J. F., Esq., Merchant	...	1865
O'Keef, J. W., Esq., Merchant, Calcutta	...	1871
Oldham, † Wilton Esq., LL.D., Civil Service	...	1867
Onasch, Revd. H., Rancho, Chota Nagpore	...	1869
Orchard, † Major W. A. D., B. S. C.	...	1871
Orr, J. Cave Esq., Solicitor, Calcutta	...	1868
Orr, Lieut.-Col. Alexander P., Roy Bareilly, Oude	...	1868
Osborne, Col. Willoughby, F. R. G. S., F.G.S., Political Agent, Bhopal, Sehore	...	1862
Osborne, † Captain J. H. Willoughby, Revenue Survey	...	1870
Onseley, Gore Esq., Commissioner, Umballa	...	1872
Owen, Lieut.-Col. W. G., (12th Madras N. I.,) Nagpore	...	1846

P.

PADDAY, † Capt, A. C., Royal Engineers	...	1871
Palmer, Charles, Esq., Medical Service, Calcutta	...	1848
Palmer, † T. A. G., Esq.	...	1861
Palmer, C. G. Esq., Assistant Engineer, Ganges Canal, Cawnpore	...	1873
Paske, Dr. C. T., Civil Surgeon, Mirzapore	...	1869
Payne, Dr. A. J., Medical Service, Calcutta	...	1860
Peal, S. E., Esq., Tea Planter, Sapakatee, Seeb- saugor, Assam	...	1867
Pearl, J. Esq., Tea Planter, Rajmore Tea Estate, Seeb- saugor, Upper Assam	...	1870



P.—(Continued)

	Admitted.
Pearry Mohun Banerjee, Baboo, Pleader, High Court, N. W. P., Allahabad ...	1868
Peel, Fredk., Esq., Merchant, Calcutta ...	1871
Pellew, F. H. Esq., Civil Service, Hooghly ...	1863
Peppe, G. T. Esq., Manager, Dunwar Estate, Pachamba...	1872
Peppe, T. F. Esq., Chota Nagpore ...	1868
Perkins, Dr. R. H. Benares ..	1859
Perrin, Monsieur, J., Silk Filatures, Berhampore ...	1859
Peter, James Esq., Lydiachorra Garden, Cachar ...	1872
Peterson, Frederick, Esq., Secy., Simla Bank, Simla ...	1862
Phear, the Hon'ble J. B., Calcutta ..	1867
Pickance, Lieut. W. John, Madras Staff Corps, Chutterpore, Ganjam District ...	1867
Picachy, Dr. David, Purneah ...	1871
Piggott, William Esq., Broker, Calcutta ...	1864
Pinney, G. F., Esq., Jorehaut Tea Company, Assam. ...	1871
Plowden,† W. C. Esq., Civil Service ...	1869
Pogost, J. G. N. Esq., Zemindar, Dacca ..	1856
Political Assistant, in charge Gondal Estate, Kattywur ..	1873
Political Agent of Morar, Gwahor ..	1873
Pollok, Major F. T., (Madras Army) Executive Engineer, Gowhatti ...	1860
Pope, C. H. Esq., Planter, Singhia Factory, Hadjapore Tirhoot ...	1872
Porter, G. E. Esq., Civil Service ..	1863
Pott,† A. C. Esq., Merchant ...	1870
Poorna Chunder Roy, Zemindar, Sarapoolly ..	1870
Poulton,† Major H. B. A., Bengal Staff Corps ...	1865
Powell, Alfred, Esq., Saharunpore ...	1871
Powell, G. E. Esq., Saharunpore ..	1873
Power, Ambrose W. B. Esq., C. S., Hill Tipperah, Comillah	1869
Prasanna Chandra Ghosa, Baboo, Calcutta ...	1869
Price, Charles E. Esq., Calcutta ..	1870
Principal, Raj Kumar College, Rajkote, Kattywur ...	1873
Pringle, R. B. Esq., Badalipar Tea Garden, Assam ...	1870
Prinsep, H. T. Esq., Civil Service, Patna ...	1870
Prior, General Ohas., Commanding at Dhurmsalla ...	1867
Proprietors, Jugdispore Estate, Beehees, Shahabad ..	1869
Protheroe,† Lieut. Montague, Madras Staff Corps ...	1869
Prosonó Coomar Banerjee, Baboo, Calcutta ...	1871
President, Municipal Committee, Allyghur ...	1870
Pyne, B. Esq., Neelgunge, Purneah ...	1867

			Admitted.
CLINTON, J. W. Esq, Civil Service	...	...	1865
<b>R.</b>			
RABAN, Col H, Shillong	...	...	1858
Radcliffe, John Esq, Merchant	...	...	1871
Rajak of Kuntal, Mirzapore	...	...	1871
Rajkissen Mookerjee, * Baboo, Landholder, Ooterparah	..	...	1836
Ramdass Sen, Baboo, Zemindar, Berhampore	...	...	1869
Ram Rungun Chuckerbutty, Zemindar of Heetapore, Beerbloom			1869
Ramanath Tagore, Vice President, Rajah Bahadoor, Calcutta	...	...	1842
Ramanyamohun Chowdry, Baboo, Zemindar, Rungpore			1861
Rattray, Haldane, Esq, Asst Supdt. of Police, Rajmahal			1871
Ravenshaw, T E Esq, Civil Service, Cuttack			1865
Rawlins, Lieut-Col J S, Commanding 1st Goorkha L. I. Dhurrumsala	...	...	1873
Reay, Lieut-Col. Chs, Benares	...	...	1871
Redpath, R Esq, Assistant Superintendent of Police, Myanong District, Henzadah, Burmah	...	...	1868
Reid, J R Esq, C S, Azimgurh	...	...	1866
Reilly, Herbert, Esq, Dy Magte, Maldah	...	...	1872
Reuss, John Leonard, Esq, Merchant, Calcutta	...	...	1873
Riach, F S M, Esq, Dhyabiedhur Luckiepoore, Cachar			1870
Richards, *† J Esq, Merchant	...	...	1834
Richardson, H Esq, C S, Kishnaghur	...	...	1872
Richardson, R J Esq, Civil Service, Ghazeeopore	...	...	1871
Ridge, W Esq, Surdah			1866
Ritchie, D W Esq, Offg. District Supdt. of Police, Chyebassa	...	...	1871
Roberts, H Esq, Indigo Planter, Bellah, Allyghur			1870
Roberts, Robert, Esq, Chief Auditor, E I. R., Calcutta	..	...	1870
Robertson, J C Esq, Civil Service, Allahabad	...	...	1854
Robinson, S H Esq, Merchant, Calcutta	..	...	1871
Robinson, W. A. Esq, Umballa	...	...	1869
Robinson, † Revd Julian	...	...	
Rochfort, M. B. Esq, District Supdt. of Police, Beaulah	...	...	1869
Rodrigues, F. Esq, Merchant	...	...	1871
Rogers, † Archd Esq, Solicitor	...	...	1858
Rogers, Lieut. G. W. 4th Goorkas, Bakloh, Punjab	...	...	1871

R.—(Continued.)

	Admitted.
Romanath Law, Baboo, Solicitor, Calcutta	1872
Hoodrurpurshaud, Chowdry,* Nanpore, Tirhoot	1867
Roordur Purbab Sing,* Rajah Bahadoor, Dewan of Punna	1868
Rocket, V. Esq., Indigo Planter, Moharagunge Factory, Azimghur	1860
Row,† Col. W. S., (33rd N. I.,)	1854
Row,† G. L. Narsing, Esq.	1871
Rowett, J. T. Esq., Merchant, Rangoon	1871
Ruddock, E. H. Esq., B. C. S., Burdwan	1868
Russeid Khan Chowdry, Moulvee, Mahomed, Zemindar, Nattore	1871
Russell, T. M. Esq., Calcutta	1868

S.

SAGORE Dutt, Baboo, Merchant, Calcutta	1850
Sage, R. P. Esq., Nurrail, Jessore	1872.
Samachurn Law, Baboo, Merchant, Calcutta	1855
Sandys, Mrs. Annie, Bhaugulpore	1870
Sanders, F. W. Esq., Lullitpore	1871
Savi,† J. R. Esq., Indigo Planter	1862
Savi, Thomas, Esq., Indigo Planter	1851
Sceales, Jaffray O'Brien, Esq., Choodangah	1869
Scott, P. G. Esq., Assistant Superintendent of Police, Durbangah, Tirhoot	1869
Scott, J. M. Esq., Professor, Civil Engineering College, Calcutta	1873
Secretary, Agricultural Society, Satkhira	1871
Secretary, Public Garden, Azimghur	1871
Secretary, Local Fund Committee, Umritsur	1859
Secretary, Local Fund Committee, Ferozepore	1861
Secretary, Public Garden, Banda	1855
Secretary, Cantonment Public Garden, Agra	1865
Secretary, Assam Company, Calcutta	1865
Secretary, Public Garden, Jaloun, Oorai	1866
Secretary, Government Garden, Muttra	1866
Secretary, Local Committee, Jahnsie	1867
Secretary, Municipal Committee, Mirzapore...	1869
Secretary, Road Fund Committee, Jaunpore	1867
Secretary, Local Committee, Chanda	1870
Secretary, Municipal Committee, Jhung	1870
Secretary, Local Fund Committee, Belaspore	1871
Secretary, Local Committee, Hoshungabad	1872

	<i>Admitted</i>
Secretary, Government Botanical Garden, Morghyr	1871
Secretary, Local Band, Nimar, Khundwa	1873
Secretary, Nyneetal Club, Nyneetal	1873
Secretary, Queen's Garden, Delhi	1873
Senior, Capt H. W. J., Superintendent of Jail, Meerut	1872
Shahamut Allee Khan, Meer Bahadoor, Superintendent of Rutteana, Indofe	1870
Shakespear, Major Genl. J. T., Nynee Tal	1872
Shamloll Dutt, Baboo, Calcutta	1871
Sharp, H. G. Esq, C. S., RaneeGUNGE	1872
Shaw, J. Esq, Sub-Deputy Opium Agent, Burhurwah Chumparun	1871
Shaw, Dr. John Cardy, Civil Surgeon, Mymensing	1873
Shearin, E. Esq, Merchant, Calcutta	1866
Shelley,† Major T. M., late 11 h Regiment	1871
Sheodial Sing,* H. H. Mohakhan, Rajah of Alwar	1863
Sherer, J. W. Esq, Civil Service, Azimgurh	1869
Sherriff, W. Esq, Jorradra, Jossore	1859
Sheetz, Dr., James, Civil Surgeon, Ruttehpore	1872
Shillingford, G. W. Esq, Kollussy Factory, Purnoah	1867
Shipp, W. Esq, C. E., G. I. P. Railway, Hurdah	1873
Stoley, George Esq, Civil Engineer, E. I. Railway, Calcutta	1869
Simons, C. J. Esq, Tea Planter, Bessella Factory, Morar Bazaar Post Office, Upper Assam	1863
Simson, James, Esq, Civil Service, Azimgurh	1856
Simmonds, F. W. Esq, Laranga Tea Garden, Cachar	1873
Skinner, E. Esq, Tea Planter, Cachar	1872
Skinner, A. Esq, The Abbey, Mussoorie	1854
Skoulling, J. W. B. Esq, R. A., Veterinary Surgeon, Saharunpore	1871
Slater, E. M. Esq, Bank of Bengal, Calcutta	1870
Smallcy,† R. B. Esq	1867
Smuth, G. M. Esq, Joyhingra Tea Estate, Lukimpore Assam	1871
Smuth, R. H. Esq, Principal Sudder Ameen, Meerut	1860
Smith, James Esq, Shahpore, Tirhoot	1863
Smith, Maxwell Esq, Hursingpore, Tirhoot	1869
Smith,† W. Esq, Dorundah Factory, Chota-Nagpore	1872
Smuth, Capt. R. G., Hazareebaugh	1872
Snow, R. W. Esq, Tea Planter, North Lukimpore, Assam	1872
Spankie, Hon'ble R., Civil Service, N. W. P., Allahabad	1865
Spencer, C. J. Esq., C. E., E. I. Railway, Ucharah	1863
Spicer, A., Esq., Tea Planter, Cachar	1869
Stalkartt, William Esq, Merchant, Calcutta, <i>Vice President</i>	

# S:—(Continued.)

Stalkartt, J. Esq., Merchant, Calcutta	... ..	1863
Stafford, Brigr. Genl. W. J. F., Commanding Eastern Frontier, Shillong	... ..	1872
Steel, Donald, Esq., Eastern Cachar Tea Company, Cachar	...	1861
Steel,† Lieut-Col. J. A., Bengal Staff Corps	...	1868
Stephen, J. Esq., Dacca	...	1855
Stephenson, Cecil Esq., Agent, E. I. Railway, Calcutta	...	1866
Sternale,† H. B. Esq., Bank of Bengal	...	1870
Stevens, H. W. Esq., Executive Engr., Durbangah	...	1867
Stevenson,*† William Esq., Junior, M. D.	...	1834
Stevenson, Geo. Esq., Civil Service, Pooree	...	1873
Stewart, A. N. Esq., Collector of Tolls, Jungypore	...	1862
Stewart, A. Esq., Manager, Oornabund Garden, Cachar	...	1870
Stewart, James Esq., Civil Engineer, Umballa	...	1873
Stewart, Robert Esq., Merchant, Calcutta	...	1873
Stirling, Lieut P. Burnbrae Bowerne, Kangra Valley	...	1873
Stocks, J. W. Esq., Berhampore	...	1866
Stokes, Allen Esq., E. I. Railway, Jamalpore	...	1867
Stoney, R. V. Esq., Civil Engineer, Ungool via Cuttack	...	1866
Stoney,† T. Butler, Esq., C. E.	...	1869
Story, Lieut Genl. P. F., Dehra Doon	...	1873
Stratton, J. P. Esq., Pol. Agent, Nowgong, Bundelkhund	...	1873
Stuart,† Alex. Esq.	...	1863
Stuart, Dr. Kenneth, B. Calcutta	...	1872
Stubbs,† Lieut-Col. W. H., 4th Regt N. I.	...	1868
Sturmer, Edwin Esq., Assistant Engineer, Orissa	...	1863
Sturmer, John, Civil Engineer, Calcutta	...	1864
Sturmer, A. J. Esq., Talooka Kojha, via Gazceopore	...	1866
Sukharam Martund, Esq., Indore	...	1872
Superintendent, Model Farm, Cawnpore	...	1860
Superintendent of the Patna Lunatic Asylum, Patna	...	1871
Superintendent, Central Prison, Benares	...	1872
Sumbhoo Narayana, Rajah Bahadoor, Benares	...	1872
Supdt of Jorehaut Tea Company, Assam	...	1865
Supdt., Serajunge Jute Company, Serajunge	...	1868
Sutcliffe, James Esq., Principal of the Presidency College, Calcutta	...	1871
Sutherland, Charles J. Esq., Merchant, Calcutta	...	1836
Sutherland, H. H. Esq., Merchant, Calcutta	...	1870
Sutherland, A. B. Esq., Merchant, Calcutta	...	1870
Suttyanund, Ghosal, Rajah,* Bhokoyelas (Vice President)	...	1869
Swinden, T. G. Esq., Calcutta	...	1855
Swinhoe, William Esq., Attorney, Calcutta	...	1859
Syed Wellayet Ali Khan, Patna	...	1871

I.

Admitted.

TAYLOR, V. T. Esq., Civil Service, Bangalore	...	1860
Taylor, W. C. Esq., Cuttaok	...	1856
Taylor, Frank, Esq., Executive Engineer, E. I. Irrigation and Canal Company, Hidgelee	...	1868
Taylor, S. H. C. Esq., C. S., Beerbhoom	...	1873
Temple, the Hon'ble Sir R., K.C.S.I., Calcutta	...	1869
Temple, Lieut.-Col. H. J., Staff Corps, Bareilly	...	1871
Tenant,† Major T. E.	...	1868
Thakore Sahib, Kajkote, Kattywar	...	1873
Thelwall, Col. J. B., C. B., Mean Meer	...	1851
Thomas, J. Esq., Merchant, Calcutta	...	1867
Thomas,† J. P. Esq., Merchant	...	1868
Thomson, John Esq., Merchant, Calcutta	...	1872
Thompson, Lieut.-Col. E., Political Agent	...	1864
Thompson,† Rivers Esq., Civil Service	...	1864
Thompson,* Dr. R. F., Hooghly	...	1865
Thompson, J. A. Esq., Chandogghat Tea Garden, Cachar	...	1871
Thompson, Henry, Esq., Manager, Moran Tea Company, Seehsaugor, Assam	...	1870
Thompson,† Nnian, Esq., Judge, S. C. Court	...	1862
Thorp, J. Esq., Lucknow	...	1867
Thurburn, E. A. Esq., Merchant, Calcutta	...	1871
Tonnerre, Dr. C. Fabre, Health Officer, Calcutta	...	1862
Toomey, Geo Esq., Indigo Planter, Chohi, Tirhoot	...	1870
Tottenham, L. R. Esq., Civil Service, Burrisal	...	1873
Trafford, Revd. John, Serampore	...	1863
Tucker,† W. T. Esq., Civil Service	...	1855
Tucker, Robert Esq., Tea Planter, Seehsaugor	...	1867
Tillock, Hugh, W. Esq., Merchant, Calcutta	...	1872
Turnbull,† C. S. Esq., Silk Manufacturer	...	1859
Turnbull, the Hon'ble G. D., Civil Service, Meerut	...	1861
Turuball,† Robert Esq., Merchant	...	1871
Turner, E. B. H. Esq., Merchant, Calcutta	...	1869
Turner,† H. G. Esq., Madras Civil Service	...	1856
Twynam,† Capt. E. J. L., Executive Officer	...	1872
Tyler,† Major Genl. Fraser, C. B.	...	

U.

UNWIN, Howard, Esq., C. E.	...	1869
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V.

VEN,† W. Ter, Esq., Merchant	...	1864
Venayk Rao Gunput Kibia Sahib, Indore	...	1872

V.—(Continued)

Admitted.

Vernon, John Esq, Executive Engineer, Dehra Doon	1871
Vertannes, J. C. Esq, Civil Engineer, Contai	1865
Vishnigram, His Highness the Rajah of	1847
Voigt, S. E. Esq., Merchant, Calcutta	1870

W.

WAGENTRIEBER, W J H. Esq, Sonaric, Seehsaugor, Upper Assam	1868
Walker, William, Esq, Tea Planter, Seehsaugor, Upper Assam	1870
Walker, Richd. Chs Esq, Bohorah Factory, Purneah	1872
Wallace, Adolphus Esq, Rungajauun Factory, Golaghat Assam	1866
Ward, J. D. Esq, Civil Service, Purneah	1869
Warner, Lieut.-Col. W J, 8th Bengal Cavalry, Meerut	1870
Ward, W E. Esq, Civil Service, Burdwan	1873
Waterfield,† E Esq, Civil Service	1846
Waterfield,† William Esq, Civil Service	1870
Waring, R. G. Esq, Manager, E. I. Railway Co.'s, Oil Factory, Manowrie near Allahabad	1873
Wauchope, S. Esq, Civil Service, Hooghly	1848
Webster,† Geo. K. Esq, Civil Service	1866
Webster,† Alex L Esq	1867
Wemyss, Sir John, Bart., Mirzapore	1859
Westmacott,† E. V. Esq., C S	1866
Weston, John Esq, Judge S C Court, Magoorah	1863
Whishaw, Dr J C, M. D, Supdt, Central Jail, Lucknow	1873
White, Robert Esq, Tea Planter, Silcoorie Tea Estate Cachar	1869
White,† Dr. J. B, 42nd Assam Light Infantry	1872
White, John Esq, Junr., Landholder, Darjeeling	1873
Whitty, Irwin J. Esq., Civil Engr, E. I. Railway Chd	
Wiebe, Kurmaton, Assensole	1867
Wigram,† Percy, Esq, Civil Service	1871
Wilcox, Frederick, Esq., Bengal Police, Poorolia	1867
Wilkinson, Major A. E., Cantonment Magte., Lucknow	1862
Wilkinson, C. J. Esq, Barrister-at-Law	1870
Wilkinson, Capt. A. R. Dist. Supdt. of Police, Calcutta	1873
Wilkinson, Revd. W. Arrah, Shahabad	1873
Williams, G. R. C. Esq., Civil Service, Dehra Doon	1872
Williamson, Lieut. W. J., Deputy Commr., Garrow Hills, Assam	1867

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	Admitted
Wainman, Lieut-Col H M, 1st Regt P.I., Multan	1866
Wilson, H W Esq, Serampore	1871
Windley, J A Esq, C.E.	1865
Wingrove, Clement Esq, Gowhatti, Assam	1871
Wintle, Major H R 10th N.I., Gonnuckpore	1870
Wintle, Col L H C	1860
Wise, Dr James Civil Surgeon, Dacca	1871
Wollen, H W Esq, Assistant Indigo Planter, Bulleah Factory, via Airah	1873
Wood, James M Esq, Dehrooghur, Assam	1865
Woodford, Dr C O, Calcutta	1863
Wordie, T H Esq, Merchant, Calcutta	1863
Wright, Lt-Col J A., Cantonment Magistrate, Morar	1871
Wright, H Esq, Shipore, Punjab	1854
Wright, A C, Deputy Magistrate, Sewan	1867
Wright, Dr David, Katmandoo Nepal	1876
Wright, W Esq, Judge, Small Cause Court, Cuttack	1866
Wunee, Ally Nawab, Gya	1872
Wynne H La Pore, Esq, Civil Service, Cashmere	1873
Wyllie, H S Esq, Seeburband Ice Garden, Cachar	1873

Y.

Young, Capt Charles, Meywar Bhoer Corps, Kherwarrah	1872
Young, W Esq, C.E.	1867
Young, James Esq, Merchant, Calcutta	1871
Young, Major Siddons, Commanding at Chunar	1871

Z.

ZANDEL, Leo, Esq, Merchant, Calcutta	1873
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